REMARKS:

Concerning action mailed 9/13/2011 section 1:

The action raises in different sections the issues of lack of support for the claims, and lack of enablement.

The MPEP 2163.03 states that "*Stated another way, information contained in any one of the specification,* ***claims*** *or drawings* ***of the application as filed*** *may be added to any other part of the application without introducing new matter*."

The portion starting on page 9, line 14 (The following methods, devices and use....") and ending on page 11, line 14 ("...in particular emergency signals") is merely a copy of the claims originally filed in the international application, which have been adapted in the text form. Please refer to the English translation of the international filing WO 2005/112041 pages 10 to 12. The action has not mentioned any *specific* grievance in relation to the portion added, hence the addition is believed to be lawful. It is recalled that I am an inventor pro se, and I described some of the processes, devices, and uses of its invention directly in the claims originally filed in the international application. Such processes, devices and uses might be needed in the specification in order to add support for the enablement issues and for the current claims. It believed that such a transfer does not introduce new matter in the application as a whole, and that it will allow for pointing to specific support should certain objections be maintained in the course of the proceedings.

Concerning action mailed 9/13/2011 section 3:

We are re-submitting as a declaration, the article of Pr. VAN GENT "Remote Stimulated Triggering of Quantum Entangled Nuclear Metastable States of Indium 115m" which is referenced [arXiv:nucl-ex/0411050v1].

Note that we did not asked that the article be incorporated in the specification. However, may would like the article as a declaration under 37 C.F.R. 1.132 to be incorporated in the record so that it could be considered among all the facts as a number of experiments are described by Pr VAN GENT.

The law states that "*Patentability shall not be negatived by the manner in which the invention was made.*".

The invention has been made by two individuals not involved in financed academic researches in the area of isomer nuclides. However, Pr. VAN GENT was at the time a Radiation Safety Officer (RSO) for LSU, and I was a retired LSU Foundation Professor previously involved in Well Logging measurements, and many other area of Physics having a Ph-D in spectroscopy.

All the available measurements are provided as declarations under 37 C.F.R. 1.132 to be incorporated in the record so that it could be considered among all the facts. As explained in the cover letter, I made an error when reporting one of the setup distance between the excited In-115 foils which was measured, and the excited In-115 foil which was stimulated by Fe-55. The error was without intent to deceive.

The three setups have been the following:

- Appendix A : First experimental protocol: QUANTUM COMMUNICATIONS AT 12 METERS / Indium foils / Fe-55 : December 5th, 2003
- Appendix B : Second experimental protocol: QUANTUM COMMUNICATIONS AT 12 METERS / Indium foils / Fe-55 : May 20th, 2004
- Appendix C : Third experimental protocol: QUANTUM COMMUNICATIONS AT 1600 METERS / Indium foils / Fe-55 : May 27th, 2004

Pr. VAN GEN in the second experimental protocol did replicated nearly in the same conditions the first experimental protocol. Such a replication is a high achievement in itself, which should question one stating that the invention is incredible.

My son, Franck DESBRANDES, who is a qualified engineer in electronics and radio electricity, having also a knowledge of statistics, has provided me with an analysis of the data which I have reviewed , and incorporated for each of the above listed setups.

We are not aware of a replication by third parties. Some reasons are provided in a later section. This is a very sad condition, because with neither a replication, nor a patent issued likely to be considered by the academic circles, the art will most likely failed to be promoted, which could be also considered as a failure of the Office when reported in the future. This might be considered as an extraordinary failure of the patent system, which is expected to support innovators, thus promoting the useful arts, and participating to economic growth, and to the well being of Society.

Page 4 line 3-6 mentions that the applicant does not explain "*which excited constituents within a sample are entangled*". We are very surprise by this assertion because the specification makes clear that In155m is used stating in [0033] the use of "*Indium sheets with **99.999% of purity***" which are "*irradiated during 20 minutes with a compact linear accelerator*". Hence, such Indium foils are composed of nuclei the 115 isotope of Indium. The entanglement of said nuclei of the 115 isotope of Indium is corrobated by the gamma rays level of energy of the dexcitation, which is measured at 336 KeV on the slave sample sheet and found to vary according to the distant Induced Gamma Emission applied to the master sample sheet. A careful reading of the work done by Mrs Cauchois in the field of photoactivation of isomer nuclides, along with our analysis of the photoactivation gateways of In115m, and their respective yields, explains a posteriori why In115m can be excited using entangled gamma coming from the Bremsstrahlung of 6 MeV accelerated electron: the reason is mainly that a CLINAC produces entangled gamma as described in the specification "*The gamma spectrum extends from 0 to 6 MeV, but is **centered on 1.5 MeV**, i.e. that, in majority, **two, three or four gamma rays are emitted in a cascade by the same electron**, when the accelerator uses electrons.*" ([0031] third sentence).

1.5 MeV gamma being above the 1078 keV and 1490 keV gateway thresholds, we were able to transfer significantly the entanglement of the irradiating gamma to the In115m isomer nuclei of the Indium foils.

Mrs Cauchois was unfortunately unable to transfer entanglement because of the upper limit (KV) of her accelerator of 2 MeV at the time, hence generating a spectrum from 0 to 2 Mev centered below 1 MeV (Please refer to our answer filed 4/17/11 page 5-8). However, she was able to provide one of the greatest pioneering contribution in the art of photoactivation, which should be acknowledged.

<u>Concerning action mailed 9/13/2011 section 4:</u>

We are inventor pro se, and our efforts to promote extraordinary advancements in the art of quantum transmission through the report of extraordinary measurements of a very well defined and specific set-up can be exactly understood by the ones skilled in the art.

It is believed that the highest duties of the Office when granting the constitutionally intended protection to an applicant, is to make sure that the protection sought by the applicant reasonably encompass what the applicant disclosure intended to protect, and more critically that the protection does not extend over prior arts, so as to leave free other activities already practiced by the public. Hence, it is believed that the present examination in focusing on the ground of 35 USC 101 usefulness of the invention has been erring, preventing the applicant to advance the application to a state of allowance at a reasonable cost, with the utmost aim of providing the right balance between the interest of the applicant and that of the public practicing prior arts, while promoting the useful arts for the benefit of Society as a whole.

Our quantum communication setup is very unique and differs from other quantum setups. Hence, the academic developments on quantum communications are of very limited interest for the following reasons: Most quantum communication setups rely upon two particles being entangled such as two visible photons, where only polarization can be exploited, or more rarely on two ensembles of particles being entangled overall, usually in the form of enclosed gas where all the atoms of a gas ensemble are entangled.

In all the experimentally based setups, the reliance on polarization limits the applications to key distribution, i.e. to the non-locally construct of two identical series of bit, which however cannot be imposed from one side. Moreover, for the particular set-up comprising gas enclosed as ensembles of particles, rapid decoherence is encountered due to the collisions between the atom of the gas, which limits the application.

However, the above setups cannot be really compared by one of good faith to the current disclosure, which is based upon the metastability of isomer nuclides coupled to the entanglement provided by gamma produced by the Bremsstrahlung of accelerated electrons : The currently analyzed setup disclosed in our application is characterized by the following :

- The use of many groups of entangled gamma produced by the Bremstrahlung of accelerated electrons;
- The transfer of the entanglement of said groups of entangled gamma to metastable Indium foils through the well known photoactivation process;

- The separation of such photoactivated In115m foils in distant places in a laboratory: one (the master) in a container ready to be de-excited by an appropriate process, and another one (the slave) in a gamma spectrometer ready to be measured for the well known 336 keV gamma emitted by excited In115m;
- The process to de-excite the master is a locally Induced Gamma Emission (IGE) produced by approaching a Fe55 source producing the lower 5.9 keV X-Rays: said IGE by accelerating the collapse of excited In115m nuclei in the master foil (local IGE) induces the collapse of a macroscopic quantity of distant quantum couplings between entangled In115m nuclei located in separate the separate Indium foils, thus allowing for the measurement of a distant increase in the rate of the 336 keV gamma produced by the slave (which is not stimulated directly by IGE).

In our setup, we are transferring the entanglement of a multitude of instant groups of gamma rays produced by the Bremsstrahlung of each accelerated electron within a CLINAC to Indium nuclei of a metastable nuclide (In115m): The sum of energies of each group of entangled gamma is bound by the kinetic energy of the accelerated electrons (6 MeV in the case of the CLINAC). Metastable Indium nuclei absorb gamma rays in the well known process of photoactivation (or excitation of the isomer nuclide) through the well known photoactivation gateways listed in the Tables of Isotopes : it is recalled that the one skilled in photoactivation determines a gateway when the diagram offers a transition from the ground state to a excited nuclear state (i.e. a transient state usually from picoseconds to nanoseconds), such excited nuclear state having transitions rapidly cascading to the metastable level. In our setup, the entangled excited metastable Indium nuclei are enclosed in the lattice of the metastable Indium samples (which are in the form of foils), thus explaining a posteriori the low decoherence of the many groups of entangled excited nuclei formed at each instant of the cLINAC irradiation. This consideration, and the metastability of the entangled isomer nuclei, constitute the a posteriori explained loophole allowing for quantum communication, which has not been considered by the academic circles, which have not considered using isomer nuclides in such a setup. Because experimenting with isomer nuclides is not allowed to students, it is now very unlikely that the setup will be re-tested

unless we carry out extraordinary efforts. Hence, the very low probability that an academic support could be found at any stage of the present invention. However, the law certainly does not state that an academic support be necessary to obtain a patent. Moreover, the Courts states that the way an invention is made shall not preclude its patentability.

The disclosure, and the data provided, support the above processes which where reduced to practice by the applicants as the graph of distant IGE was reproduced in the filing.

Concerning action mailed 9/13/2011 section 5:

The specification as completed with the portion of the claims filed in the international application provides for an enabling disclosure of the invention.

There are no relation between the present specification and disclosure, and the experimental setups reported by Genovese M., Physics Reports 413 319-396 (2005)) as is admitted by the action itself: "*on the much simpler case of photon entanglement*" because these experiments reported by Genovese are based on optics and the entanglement of the visible photons using polarization. It is well known that the setups involving the polarization of two entangled photons only allows for the distribution of keys with timings and resolution issues that have absolutely nothing in relation with our setup based upon isomer nuclides and high energy gamma. Our specification should be read with its own lexicographic definition of entanglement as provided by the law, namely the entanglement of high energy gamma results from the Bremsstrahlung of high energy electrons, or from the cascade of gamma emitted by Co60. Such entanglement may or may not have a distant relation with visible photons entanglement because the method of producing entanglement, and the energies of 1.5 MeV gamma are many orders of magnitude different as compared to visible photons (a few eV).

The one skilled in the art of isomer nuclides, photoactivation and induced Gamma Emission (IGE) perfectly knows how to reproduce our setup upon reading the specification

Section 5 states that "*it is noted that the "preamble" asserts the method to be a method of controlling a remote deexcitation of an excitation by gamma rays, for which however*

the specific isomeric nuclei would have to be identified by specific and extremely skillful measurement techniques including timing."

The specification lists an application of such remote control of the deexitation (page 11 lines 22-24). "*Medical applications are also possible by remotely stimulating the product according to the invention, of which one slave sample can be placed close or in the organ to be treated*." As can be seen from the measurement of the remote deexcitation in Figure 2 of the specification, using that remote deexcitation of 115In can be exploited where the need arises. We do not see why such remote deexcitation control would pose any problem of implementation: in the case of 115 In, the use of the remote deexcitation of the 115In foils is comprised of 336 keV gamma, which may fit for an intended use. Other isomer nuclides have their own characteristic lines of emission, which can be selected by the one skilled in the art according to the specific needs of irradiation. Releasing quickly a certain dose of radiation by a distant action has many uses depending upon the released gammas, and does not pose any measurement issues.

The action states that "*The level of ordinary skill is wholly inadequate to carry out the experimental work needed to use the invention for its stated purpose, because no one skill in the art has thus far succeeded while the specification does not provide specific directions and evaluated, experimental data to guide one skilled in the art*." This assertion is not a valid argument because there is no relation between the "level of ordinary skill" and the supposed fact that no third party has replicated the invention. Many reasons could explain why a replication has not yet been undertaken:

- The huge cost of using a CLINAC: the applicants were lucky to be able to use a CLINAC during its maintenance and tests scheduled during weekends;
- The compartmenting of laboratories;
- The prejudices of a number of academics;
- The very harsh radiation safety requirements preventing any such experiment to be carried out by students, or regular personnel: safety requirements would require that such experiment be carried out in a robotized environment inducing huge costs of operations.

The level of ordinary skill is currently not well assessed by the action: MPEP 2164.05(b) states that: "*The relative skill of those in the art refers to the skill of those in the art in relation to the subject matter to which the claimed invention pertains at the time the application was filed. Where* ***different arts*** *are involved in the invention, the specification is enabling if it enables* ***persons skilled in each art to carry out the aspect of the invention applicable to their specialty****. In re Naquin, 398 F.2d 863, 866, 158 USPQ 317, 319 (CCPA 1968).*"

Hence, the ones skilled in the art of isomer nuclides, photoactivation and IGE perfectly knows which steps are to be carried.

The assertion that undue experimentation would be needed to carry out the invention is not specific. Undue experimentation might be proved only in the future when practicing the invention. Any current statement that the invention requires undue experimentation is only supported by non-specific arguments because the currently reduced to practice setup using In115m is very easy to test for the ones skilled in the art having an access to a CLINAC and to a nuclear laboratory having gamma detection equipment and IGE sources. There are no anticipated difficulty in testing another isomer nuclide apart from having access to such laboratory, provisioning such an isomer nuclide, and implementing radiation safety, which is feasible in large specialized industries.

Concerning action mailed 9/13/2011 section 6:

The reasons given above concerning section 4 and 5 are readily applicable: the process is "useful" because its credibility is asserted from the measurements which we provide as declarations under 37 C.F.R.1.132.

Concerning action mailed 9/13/2011 section 7:

The reasons given above concerning section 4 and 5 are readily applicable: the ones skilled in the art know how to apply the process because because its credibility is asserted from the measurements which we provide as declarations under 37 C.F.R.1.132, and because the specification describes the very same steps to be operated.

<u>Concerning action mailed 9/13/2011 section 8:</u>

The reasons given above concerning section 4 and 5 are readily applicable: the ones skilled in the art knows that the process is operative from the analysis of the measurements which we provide as declarations under 37 C.F.R.1.132, and because the specification describes the very same steps to be operated.

<u>Concerning action mailed 9/13/2011 section 9:</u>

The reasons given above concerning section 4 and 5 are readily applicable: the ones skilled in the art can follow the teachings of the specification which describes the very same steps to be operated as in the claims.

Section 9 does not point to any specific matter in the claims, which would not be supported in the specification.

It is recalled that the specification has been augmented with the claims text filed in the international filing in accordance with the law.

Hence, the claims are supported by the specification.

<u>Concerning action mailed 9/13/2011 section 10:</u>

Claims have been amended in response to what is believed to be difficulties in understanding the proper extent of the claims in section 10 and for related improprieties. It is believed that section 10 reasoning might suggest that the wording of the claims is too complex with expression “*at least one kind of isomer nuclides*”, “*at least one metastable state*”, etc. while the invention is very simple, but its protection is rather difficult due to the possibility to mix various nuclides having characteristic lines, or other variations based upon the very teachings of the application. Applicant states that the amendments in the claims do not represent an abandonment of matter included the teachings of the specification, which are broad and transverse, but rather a tentative rephrasing for helping those, which might not be fully skilled in the art of metastable nuclides, including their photoactivation, and IGE, to interpret the claim scope correctly.

It is believed that the action does not acknowledge correctly our answer filed 2011/01/17 where we explained that the one skilled in the art makes the difference between very short transient states (also called “excited nuclear states” in academic

circles) which are from less than 1 picoseconds to a few nanoseconds, and the metastable state(s) of which half lives are much longer.

Here is a summary of the a number of isomer nuclides from the Table of isotopes which is common knowledge to the one skilled in the art of nuclear isomers:

Isomer Nucleides	Symbols	Half_life (metastable)	Characteristic lines	Exited Nuclear States beside the Metastable one(s)			
				Minimum		Maximum	
				Spin	Life time	Spin	Life time
Niobium	93Nb41	16,13 y	31,8 keV	11/2+	0,35 ps	15/2+	<14 ns
Cadmium	111Cd48	48,54 m	396,2 keV	7/2+	0,12 ps	3/2+	85 ns
Cadmium	113Cd48	14,1 y	263,5 keV	5/2+	0,9 fs	5/2+	10,8 ns
Cesium	135Ce55	53 m	96 keV - 786 keV	NA	NA	5/2+	0,28 ns
Indium	115In49	4,48 h	336,2 keV	6/2+	0,35 ps	3/2+	<0,25 ns
Tin	117Sn50	13,6 d	156 keV - 158 keV	5/2+	<0,4 ps	7/2+	986 ps
Tin	119Sn50	293 d	65 keV - 18 keV	7/2+	>0,3 ps	7/2+	35 ps
Tellurium	125Te52	57,4 d	144,8 keV	5/2+	1,28 ps	3/2+	0,7 ns
Xenon	129Xe54	8,8 d	238,1 keV	5/2+	2 ps	3/2 +	0,97 ns
Xenon	131Xe55	11,8 d	163,9 keV	5/2+	0,5 ps	9/2-	1,6 ns
Hafnium	178Hf72	31 y - 4 s	574 ,,,to ,,,,93 keV	2+	0,02 ps	2+	1,48 ns
Hafnium	179Hf72	25 d - 18,7 s	453 ,,,to ,,,,122 keV	11/2+	0,37 ps	7/2-	1,85 ns
Iridium	193Ir77	10,5 d	80,2 keV	3/2+	1 ps	7/2-	0,19 ns
Platinium	195Pt78	4 d	259,3 keV	7/2-	6 ps	5/2-	0,67 ns
y year							
d day							
m minute							
s second							
fs fentosecond							
ps picosecond							
ns nanosecond							
keV kilo electron volt							

As can readily be viewed in the above sample list of the metastable isomers which were listed in the specification, the half life of a metastable state is easily differentiated from the very short “excited nuclear states”. While an isomer nuclide has one or two metastable state, each with a characteristic line which can be individually measured using a gamma spectrometer, there are many ”excited nuclear states”: such “excited nuclear state” having at most a few nanoseconds half life, the one skilled in the art clearly understands that the teachings of the invention apply to metastable states, because you do not extract an excited isomer nuclide from a cLINAC to measure an

energy line within nanoseconds, or microseconds should you intend to use it after elapsing a number of half lives.

Considering 115In diagram shown in the Figure below, it is clear for the one skilled in the art that there is a unique metastable state having a half-life of 4.486 hours, and that the other “excited nuclear state” are not metastable. Moreover, the one skilled in the art of photoactivation immediately determines the gateways to photactivate the isomer nuclide, which allow for cascading rapidly to the metastable stable (spin ½ -).

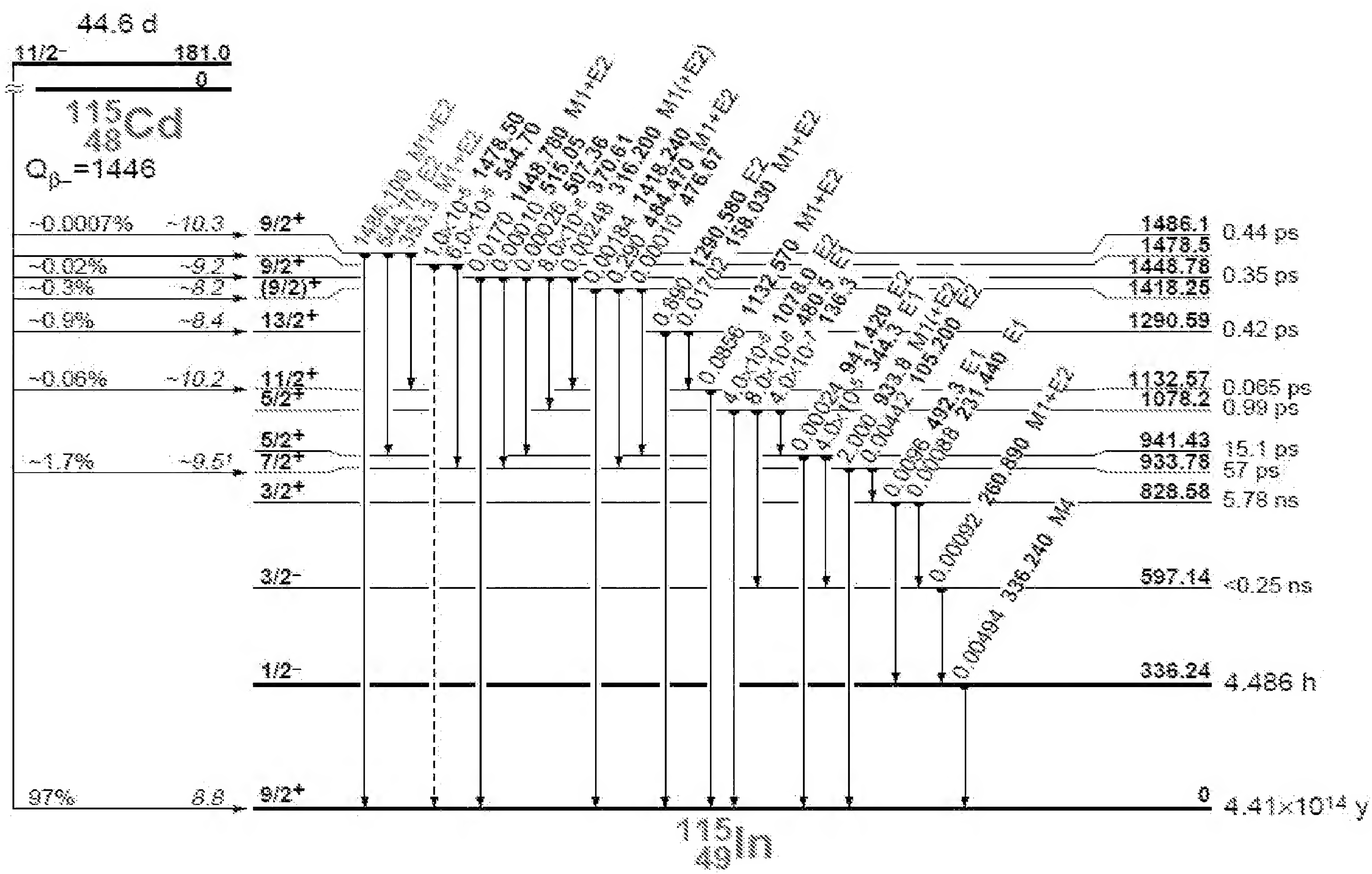

Figure 1. Diagram of the energy levels of Indium 115 (from document [8])

Figure 2 below presents similar diagrams for Cadmium 113 with a metastable state of 14.1 years and a characteristic line of 263.6 keV.

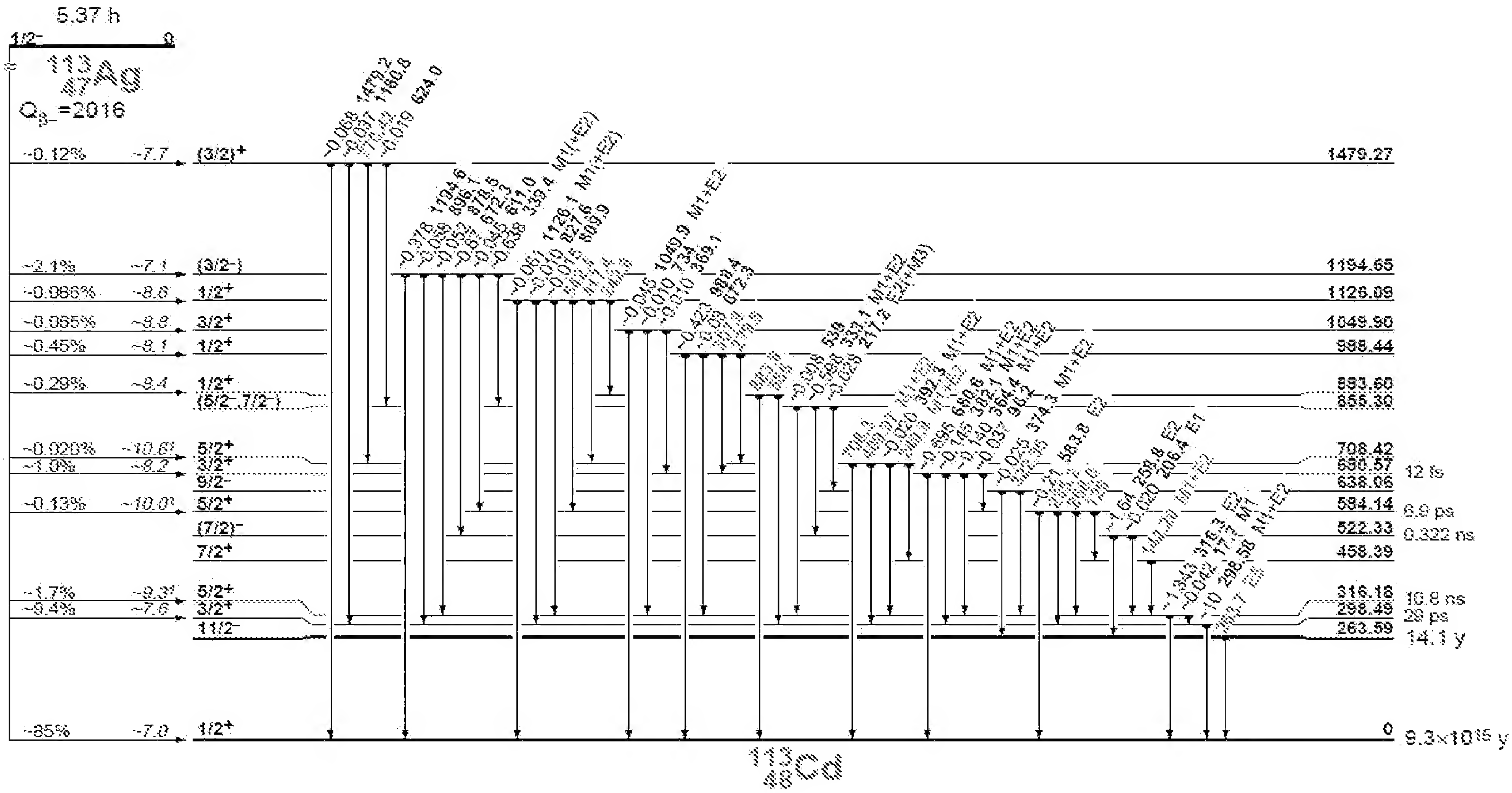

Figure 2. Diagram of the energy levels of Cadmium 113 (from document [8])

So, we really don't understand the statement reiterated at section 10 of the action "*However, examiner takes official notice for the fact that 115In has more than a single metastable state*."

We maintained that 115In has a single metastable state, like many other metastable isomer, and that the other "excited nuclear states" are short lived, and that when the isomer nuclide is photoactivated with 1500 keV gamma, all the activated "excited nuclear states" cascade rapidly (within a few picoseconds or nanoseconds), either to the ground state, or to the metastable state (spin 1/2 –) in case of Indium. During this cascade, numerous energy lines are emitted, which are listed in the Table of Isotopes,

and which cannot be confused with the 336 keV characteristic line of the single metastable state by the one skilled in the art.

Hence, after the CLINAC photoactivation, when the Indium 115 foils are removed and separated to be carried out to the container with the capability to move an Fe-55 source next to it, and to the gamma spectrometer enclosed in a two tons lead enclosure, the foils clearly comprised of 115In in the metastable state (spin ½ -) and in the ground state (spin 9/2+). The one skilled in the art is completely in accordance with these facts as is explained by Mrs. Cauchois, and all the academic community involved with photoactivation. Restating the above phrase, when inserting the foil into the gamma spectrometer, even if the spectrometer were not set to the 336 keV characteristic line and would be able to record other energies, one skilled in the art would only measure the 336 keV energy because 115 In has only a single metastable state.

The specification provides many operating details on the setup, and the one skilled in the art is taught that, when a Fe55 source, which produces 5.9 keV X-Rays, is approached in order to induce the very well known Induced **local** Gamma Emission (IGE) on the master foil, the gamma spectrometer records in the 336 keV characteristic line on the slave foil (**not locally stimulated**) an increase in deexcitation which is significant.

Hence, the one skilled in the art readily knows from the teaching of the specification that the excited metastable nuclei (spin ½ -) corresponding to the 336 keV characteristic line, are the only possible entangled particles that can account for the significant increase in the measured characteristic line of In115.

MPEP 2163 states that "*On the other hand, there may be situations where **one species adequately supports a genus**. See, e.g., Rasmussen, 650 F.2d at 1214, 211 USPQ at 32627 (disclosure of a single method of adheringly applying one layer to another was sufficient to support a generic claim to "adheringly applying" because **one skilled in the art reading the specification would understand that it is unimportant how the layers are adhered, so long as they are adhered**);*"

The present case is very specific: Metastability of isomer nuclides is a very well defined field of technology with extensive researches conducted for 80 years. Numerous treaties, and academic papers have been published, with the Table of Isotopes

recording most of the nuclear excitation states and transitions according to the decay of all applicable elements. A large number of decay diagrams leads to metastable isomers, thus listing the photoactivation gateways applicable to said isomer. Hence, we really do not understand the reiterated reasoning of the action that our setup based on an isomer nuclide having a well defined metastable state leading to such an extraordinary conclusion that the excited metastable nuclei of said isomer nuclide have the capacity to carry on over time the entanglement transferred by photoactivation would not be readily understood by the one skilled in the art, and applied to other metastable isomers. Not recognizing such a compelling teaching would be like rejecting all **transversal** inventions, like limiting the invention of a DNA sequence transfer providing for the production of a protein to a single specific bacteria disclosed. The field of isomer nuclide is very predictive according to the Table of isotopes in terms of decay, excited nuclear states transitions, associated energies, and metastable states and characteristic lines. There are no specific reasons to believe that what has been achieved with 115In could not be achieved with other isomer nuclides as has been fully stated in the filed application.

Moreover, it can readily be deducted from above, that section 10 is not internally coherent in its reasoning when mentioning "*Therefore, the claimed invention is not enabled over its scope.*" While the title of section 10 is "Claim 69-85". It is recalled that in the current examination phase, all the standing claims should have been read over the 115In species, and, that in the hypothesis that it would not have been read over the 115In species, that dependant claim 81 is limited to the 115In species: clearly, claim 85 is enabled over its scope.
We believe that this improper treatment is causing a great delay in the processing's of this application, and is preventing the applicant to advance the application to a state of allowance by focusing on the wrong issues. Because we are inventor pro se, having very limited funds to commit to our researches, with the patents consuming a huge chunk of it, one should consider in every aspects of this examination, how he/she fulfills the objectives of the law including the constitutional aim of promoting the useful arts.

Withdrawn claims have been amended in order to remain in line for future rejoining.

Concerning action mailed 9/13/2011 section 11:

Claims have been amended in order to point out and distinctly claim the subject matter regarded as our invention.

The metes and bounds of the claims are very well defined with each feature supported by the specification as amended in accordance with the law.

Enablement of the invention has been discussed above.

Moreover, it is recalled that in the current examination phase, all the standing claims should have been read over the 115In species, and, that in the hypothesis that it would not have been read over the 115In species, that dependant claim 81 is limited to the 115In species: claim 85 is particularly supported by the specification.

Concerning action mailed 9/13/2011 section 12:

Enablement of the invention has been discussed above.

Moreover, it is recalled that in the current examination phase, all the standing claims should have been read over the 115In species, and, that in the hypothesis that it would not have been read over the 115In species, that dependant claim 81 is limited to the 115In species: claim 85 is particularly enabled by the specification.

Conclusion:

We hope that the whole file could be re-considered taking into account the facts, including the declarations under 37 C.F.R. 1.132, in order to determine whether it is more likely than not that the invention is credible, all other issues being connected as the action has implicitly stated that this invention would be extraordinary.

In the hand of the Office lay the power to give the right impulse to advance a whole area of related technologies far larger than the very narrow scope of the present invention, which otherwise might remain undiscovered for decades.

Appendix A : 37 C.F.R. 1.132 Declaration : First experimental protocol:

QUANTUM COMMUNICATIONS AT 12 METERS / Indium foils / Fe-55

December 5th, 2003

The following appendix is a declaration section 37 C.F.R. 1.132

I, Robert DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.
I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert DESBRANDES
S-Signed: /Robert DESBRANDES/
Original submitted with my USPTO efiling electronic signature.

The experiment was carried out in Louisiana State University, Baton Rouge, Louisiana on December 5th, 2003.
During the measurements in laboratories (contiguous rooms):

- I was operating the gamma spectrometer which was a Canberra high purity intrinsic Germanium gamma counting system enclosed in an Orthec low level background shield made of lead, copper and steel;
- Professor Daniel Lee VAN GENT was operating the Fe-55 source

I interpreted the measurement data. The statistical analysis has been done by my son, Franck DESBRANDES, and I reviewed it.

The experiment comprises the steps of preparing three excited Indium foils (the "entangled" samples) and carrying out the stimulation with Fe-55 :

- Indium foils are prepared together by irradiation using a CLINAC set at 6 MeV, for a total of 20 minutes irradiation.
- The indium foils are then carried over approximately 1300 meters across the campus, separated and used in adjacent laboratories: The two Indium foils are about 12 meters apart during the IGE de-excitation of the master, and the measurements of the slave:
    - ✓ One Indium foil (the "master" sample) is locally stimulated by approaching a Fe-55 source (Fe ON tag on Figure below), then removed (end of Fe ON tag) and so on.
    - ✓ Another distant Indium foils (a "slave" sample) is measured inside the gamma spectrometer (336 keV channel) : The 336 keV gamma count of this distant Indium foil (which is not stimulated) is depicted in the Figure A-2 (the solid curve represents the raw data), in Figure A-3 (the solid curve represents the 5 minutes moving average in counts per minute) and in Figure A-4 (the solid curve represents the same 5 minutes moving average, but with the counts cumulated of a 5 minutes).
    - ✓ Another distant Indium foil (a "slave" sample) is measured inside a beta spectrometer : The beta count of this distant Indium foil (which is not stimulated) is depicted in Figure A-3 below (the dashed curve represent a 5 minutes moving average – in arbitrary unit).

Hence, measurements starts about 9-10 minutes after ending the irradiation by the CLINAC.

Note: the "no stimulation" curves on Figure A-2 and A-3 had been added in order to allow an rough comparison of the order of the supplement due to the remote IGE of Fe55. "No stimulation" curves are measures of the natural deexcitation of an excited Indium foil from a different run with no direct or remote IGE performed.

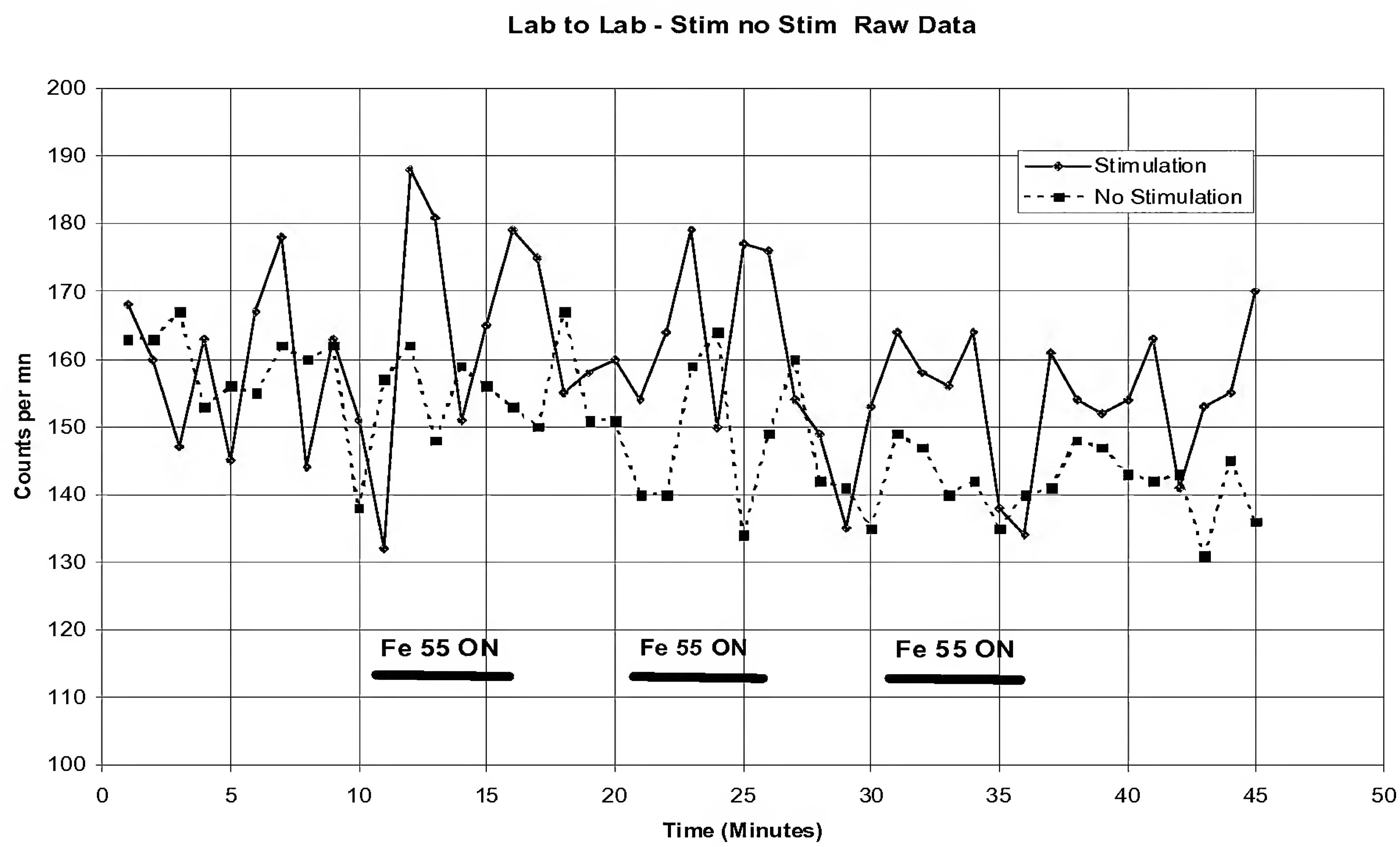

Figure A-1. Quantum communication at 12 meters (raw data).

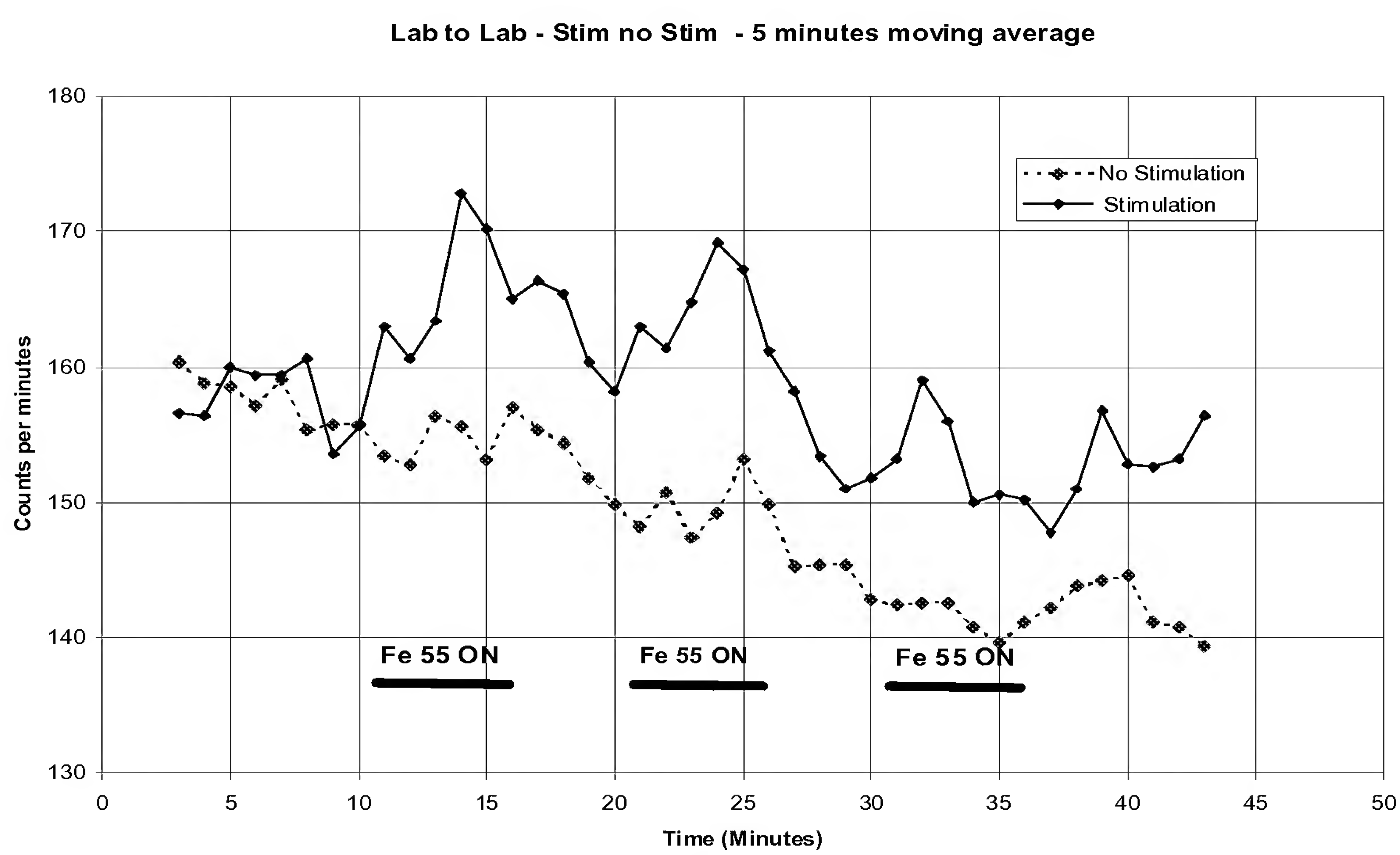

Figure A-2. Quantum communication at 12 meters (5-minutes moving average).

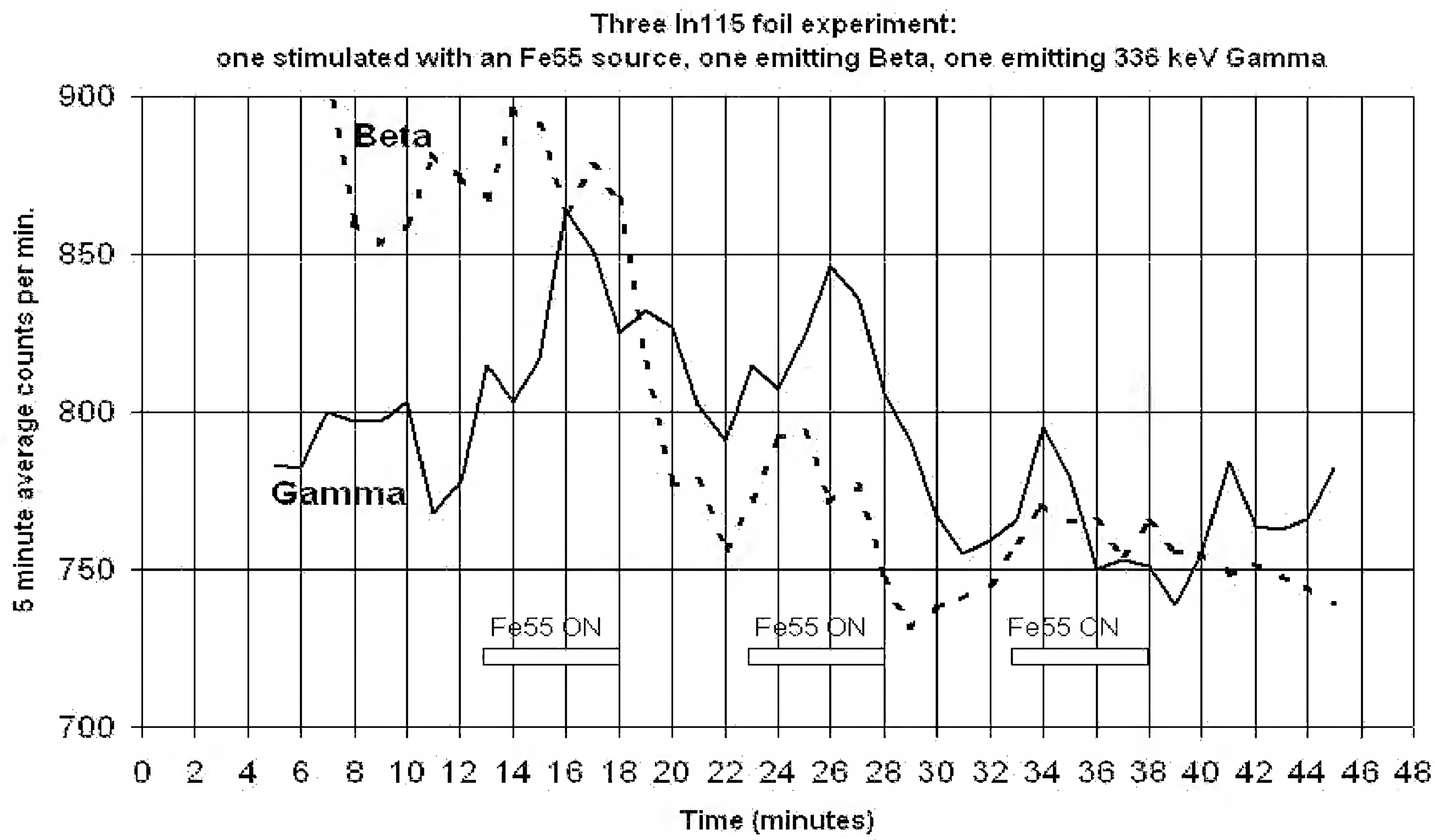

Figure A-2. Quantum communication at 12 meters (5-minutes moving average : cumulated counts).

Table of data:

- Column (1) : Time in minutes.
- Column (2) : Natural gamma emission from a non stimulated Indium foil.
- Column (3) : Remote IGE from an entangled Indium foil while another entangled Indium foil is stimulated locally with an Fe55 source.
- Column (4) : Fe-55 stimulation (beginning of stimulation : ON and ending of stimulation : OFF)
- Column (5) : 5 minutes moving average of column (2).
- Column (3) : 5 minutes moving average of column (3).

Test Lab to Lab - In115m irradiated with CLINAC 6 MeV					
	Gamma	Gamma		Gamma	Gamma
time mn	No Stim	Stimulation		No Stim	Stimulation
1	163	168		Average 5 mn	Average 5 mn
2	163	160			
3	167	147		160	157
4	153	163		159	156
5	156	145		159	160
6	155	167		157	159
7	162	178		159	159
8	160	144		155	161
9	162	163		156	154
10	138	151		156	156
11	157	132	FE-55 ON	153	163
12	162	188		153	161
13	148	181		156	163
14	159	151		156	173
15	156	165		153	170
16	153	179	FE-55 OFF	157	165
17	150	175		155	166
18	167	155		154	165
19	151	158		152	160
20	151	160		150	158
21	140	154	FE-55 ON	148	163
22	140	164		151	161
23	159	179		147	165
24	164	150		149	169
25	134	177		153	167
26	149	176	FE-55 OFF	150	161
27	160	154		145	158
28	142	149		145	153
29	141	135		145	151
30	135	153		143	152
31	149	164	FE-55 ON	142	153
32	147	158		143	159
33	140	156		143	156
34	142	164		141	150
35	135	138		140	151
36	140	134	FE-55 OFF	141	150
37	141	161		142	148
38	148	154		144	151
39	147	152		144	157
40	143	154		145	153
41	142	163		141	153
42	143	141		141	153
43	131	153		139	156
44	145	155			
45	136	170			

Original statistical analysis of the measurement data:

The original statistical analysis was the following graph plotted in the Excell dataheet with the following translation for the legends in French language:

- Title : Distant Excitation Fe55 December 5th 2003 Indium
- Abscissa: Time in minutes
- Ordinate: 5 minutes Gamma counting at 336 keV
- “NON” meaning “NO”, i.e. no stimulation by the Fe-55 source
- “OUI” meaning “YES”, i.e. stimulation by the Fe-55 source.

The gamma counts are cumulated over 5 minutes periods in order to show the absolute count for each period of non-stimulation or stimulation.

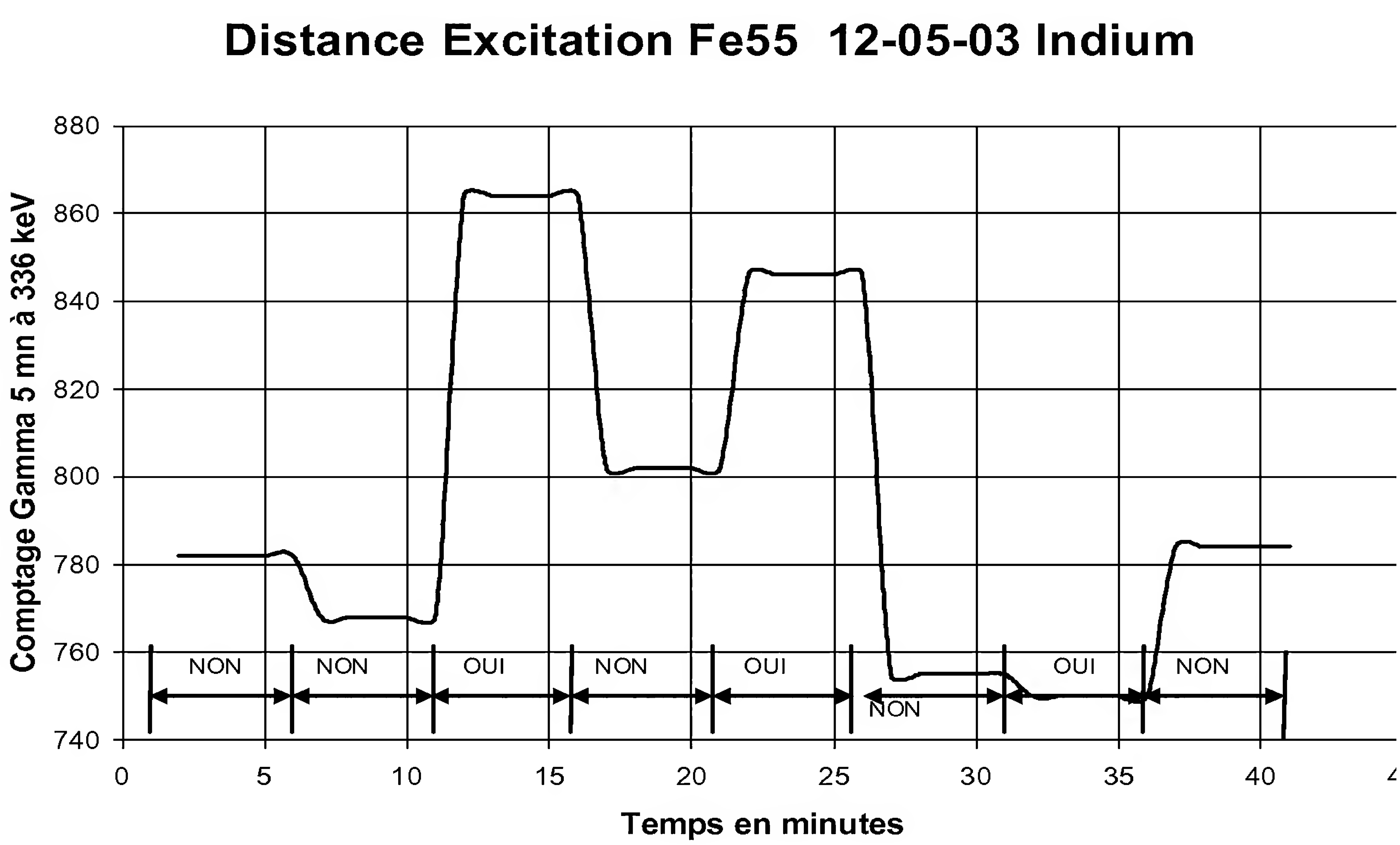

Figure A-3. Distant Stimulation using Fe55.

The graph displayed in figure A-3 was included in the French priority patent filing filed April 13th, 2004 and in the present international patent filing filed March 28th, 2005.

Current statistical analysis of the measurement data with standard deviation:

It is believed that the one skilled in the art of isomer nuclides knows that gamma measurements of the de-excitation of photoactivated In115m sheet present a high standard deviation.

In order to assess the likelihood that a quantum transmission did occur during the stimulation periods, the one skilled in the art would compute the trend of the data measured during un-stimulated periods, and than make a simple analysis of the deviation from the trend both for the un-stimulated periods and the stimulated periods.

The trend can be determined over the un-stimulated periods as shown on figure 1 below:

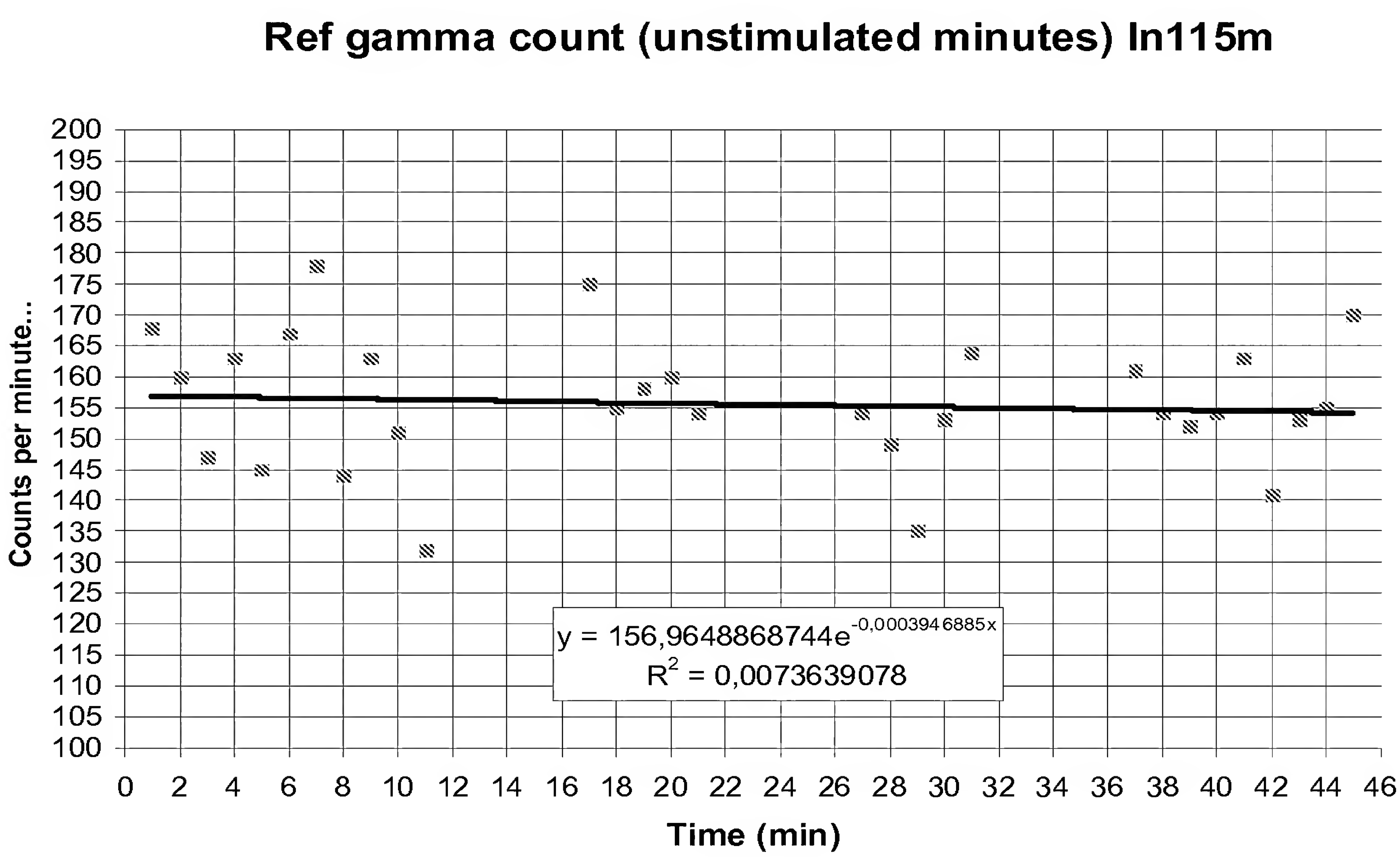

Figure A-4. Trend computed over the measurements of un-stimulated minutes

Hence, the measurements and the trend can be listed for the 45 minutes using the equation shown on Figure 1:

Minutes	Measures gamma count per minute	Stimulation actions	Trend gamma count per minute
1	168,00	FE-55 OFF	156,90
2	160,00		156,84
3	147,00		156,78
4	163,00		156,72
5	145,00		156,66
6	167,00		156,59
7	178,00		156,53
8	144,00		156,47
9	163,00		156,41
10	151,00		156,35
11	132,00	FE-55 ON	156,28
12	188,00		156,22
13	181,00		156,16
14	151,00		156,10
15	165,00		156,04
16	179,00	FE-55 OFF	155,98
17	175,00		155,92
18	155,00		155,85
19	158,00		155,79
20	160,00		155,73
21	154,00	FE-55 ON	155,67
22	164,00		155,61
23	179,00		155,55
24	150,00		155,49
25	177,00		155,42
26	176,00	FE-55 OFF	155,36
27	154,00		155,30
28	149,00		155,24
29	135,00		155,18
30	153,00		155,12
31	164,00	FE-55 ON	155,06
32	158,00		154,99
33	156,00		154,93
34	164,00		154,87
35	138,00		154,81
36	134,00	FE-55 OFF	154,75
37	161,00		154,69
38	154,00		154,63
39	152,00		154,57
40	154,00		154,51
41	163,00		154,45
42	141,00		154,38
43	153,00		154,32
44	155,00		154,26
45	170,00		154,20

(coma is the decimal point).

It is then possible to compute the deviation from the trend over the 5-minutes periods which are either a 5-minutes stimulated period or a 5-minutes non-stimulated period:

5-min Interval number	Interval (in minutes)		Stimulation	(M) Measured gamma count cummulated	(T) Gamma count trend cummulated	Difference between (M) and (T) Gamma count per 5 min period	Difference between (M) and (T) ratio
	from	to					
1	1	5	No	782,00	783,59	-1,59	-0,0020
2	6	10	No	768,00	782,04	-14,04	-0,0180
3	11	15	Yes	864,00	780,50	83,50	0,1070
4	16	20	No	802,00	778,96	23,04	0,0296
5	21	25	Yes	846,00	777,43	68,57	0,0882
6	26	30	No	755,00	775,89	-20,89	-0,0269
7	31	35	Yes	750,00	774,36	-24,36	-0,0315
8	36	40	No	784,00	772,84	11,16	0,0144

(coma is the decimal point).

The statistician can easily compute the standard deviation of the un-stimulated intervals

deviation ratios from the trend (last column of the above table):

- The standard deviation (sigma) is: 0.023093958 (2.3%) for 5-minute un-stimulated intervals.

Hence, it is easy to evaluate a 95% confidence interval of how much the 5-minutes stimulated interval values depart from the trend for the 5-minutes un-stimulated intervals (refer to Figure A-5 below) and for the 5-minutes stimulated intervals (refer to Figure xxx below). The 95% confidence interval is considered to be at +/- 2 sigma by approximating a normal distribution:

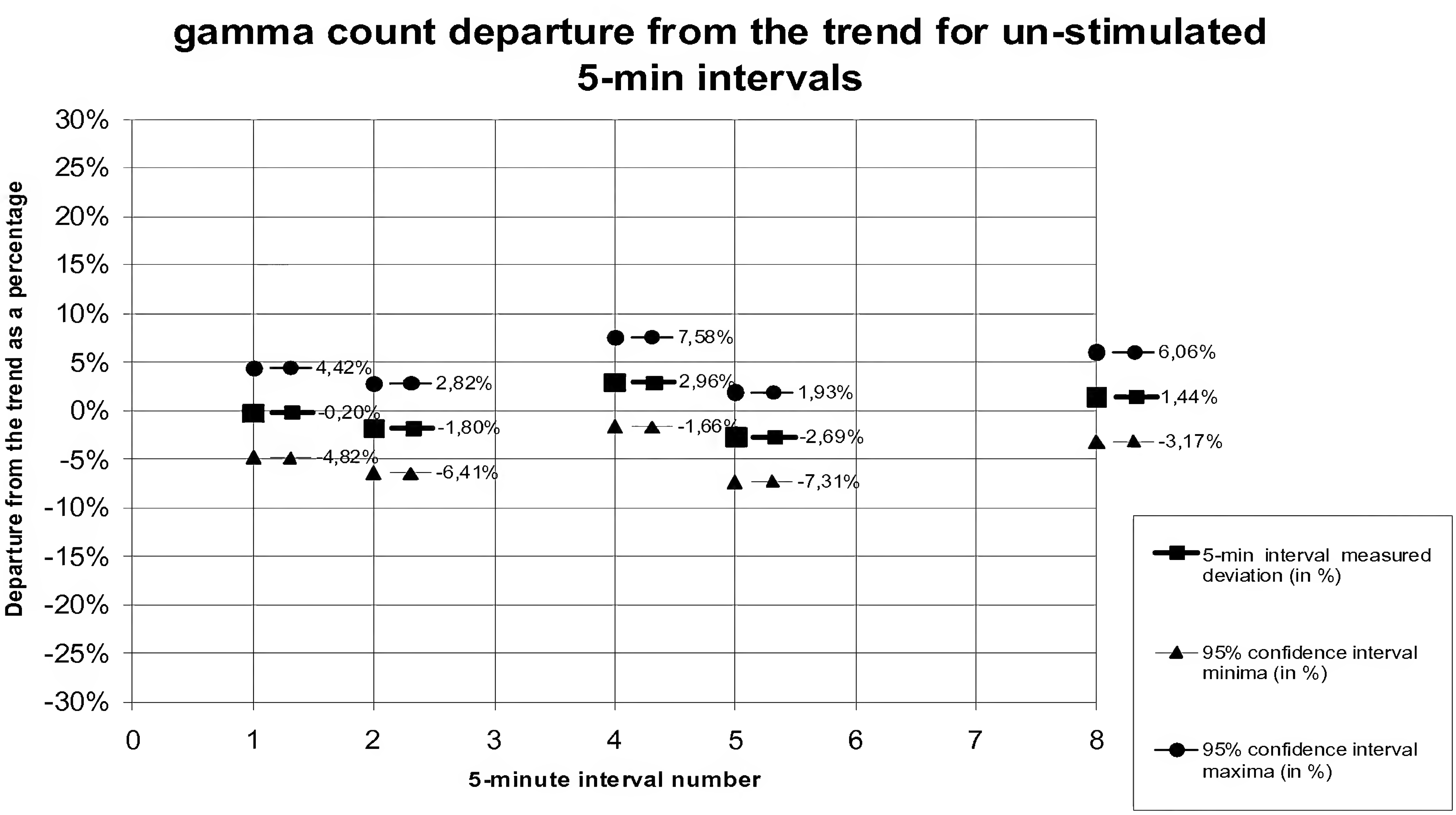

Figure A-5. Gamma count departure for un-stimulated 5 minute interval.

The non-stimulated intervals essentially provide a reference in order to assess the stimulated intervals as displayed in Figure A-6 below:

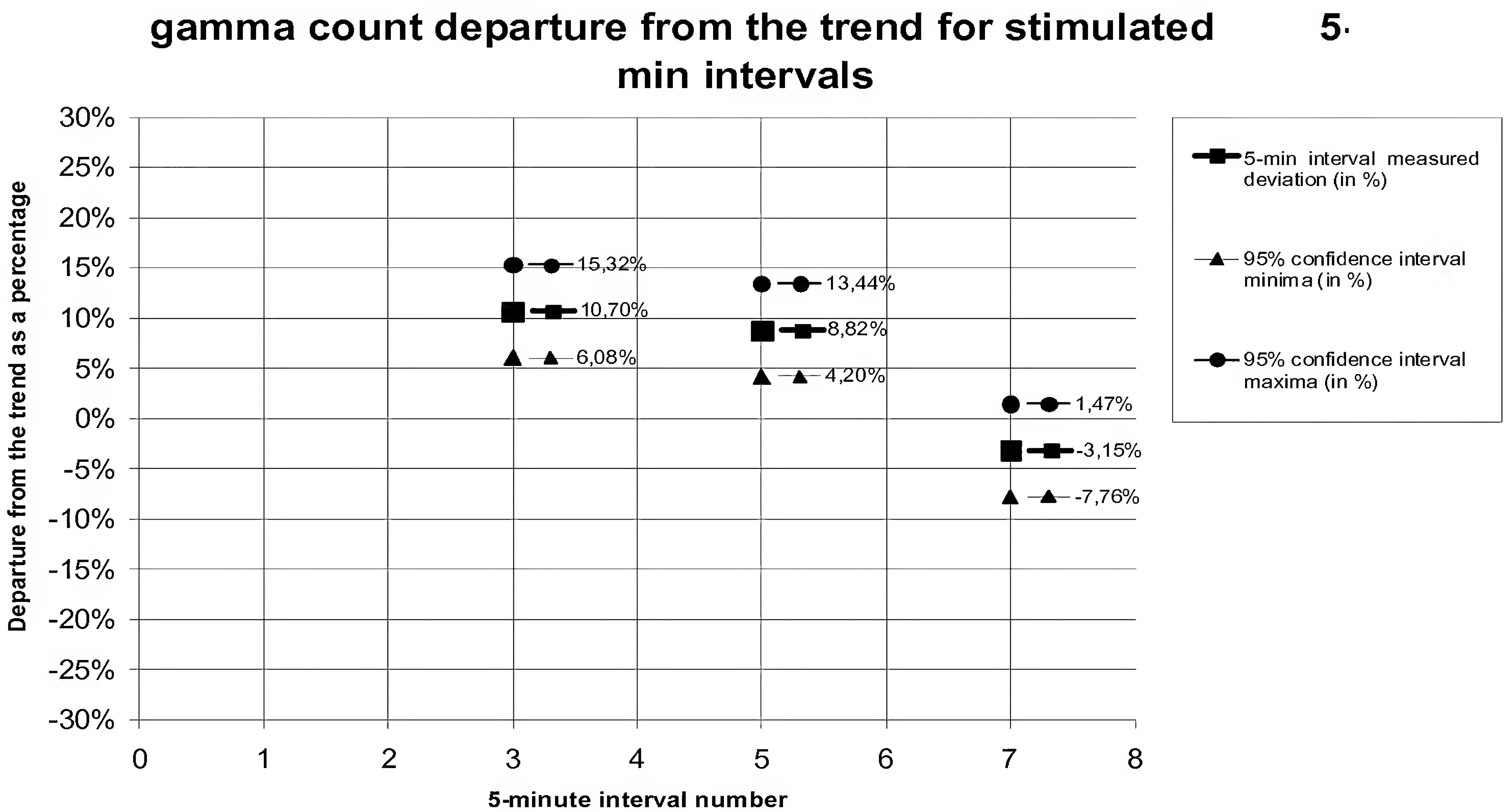

Figure A-6. Gamma count departure for stimulated 5 minute interval.

Conclusion:

The 95% confidence interval suggests that the first two stimulations of 5-minute which were applied at intervals 11-15 minutes and at 21-25 minutes displayed a departure from the trend which was significant as compared to non-stimulated intervals.

The one skilled in the art is able to determine the immediate utility of the invention which can allow for the determining of a quantum communication of an information using the setup. The utility is particularly valuable because the quantum communication can be implemented between any medium as the gamma spectrometer was enclosed in a container having walls made of 0.3 cm of copper and 15 cm of lead and 16 cm of iron.

Appendix B : 37 C.F.R. 1.132 Declaration : Second experimental protocol:

QUANTUM COMMUNICATIONS AT 12 METERS / Indium foils / Fe-55

May 20th, 2004

The following appendix is a declaration section 37 C.F.R. 1.132

I, Robert DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.
I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert DESBRANDES
S-Signed: /Robert DESBRANDES/
Original submitted with my USPTO efiling electronic signature.

The experiment was carried out in Louisiana State University, Baton Rouge, Louisiana on May 20th, 2004.

All the measurements have been done by Professor Daniel Lee VAN GENT, and have been communicated to me. I, Robert DESBRANDES, have made the interpretation of the data presented in this declaration. The statistical analysis has been done by my son, Franck DESBRANDES, and I reviewed it.

Additional declaration: These data have been submitted to the Office with an error in the response filed 2011-04-17 comprising an error, without intent to deceive. The error was that the measures were said to be done with In115m sheets 1600 meters away. The corrected information is that the In115m foils were at 12 meters away while measured as Professor VAN GENT has decided to repeat the measurement made on December 5th, 2003. I apologize for making the error, which unfortunately was also done with the European Office with the case now closed.

The 1600 meters apart measurements were done by Professor VAN GENT on May 27th, 2004, and are now reported in Annex C.

Experiment comprises the steps of preparing two excited Indium foils (the “entangled” samples) and carrying out the stimulation with Fe-55 :

- Indium foils are prepared together by irradiation using a CLINAC set at 6 MeV, for a total of 20 minutes irradiation.
- The indium foils are carried over approximately 1300 meters across the campus, then separated and placed in apparatuses in two adjacent laboratories 12 meters away: The two Indium foils are about 12 meters apart during the IGE de-excitation of the master, and the measurements of the slave:
    - ✓ One Indium foil (the “master” sample) is locally stimulated by approaching a Fe-55 source (Fe ON tag on Figure below), then removed (end of Fe ON tag) and so on.
    - ✓ The other distant Indium foils (the “slave” sample) is measured inside a NaI gamma spectrometer (336 keV channel) : The 336 keV gamma count of this distant Indium foil (which is not stimulated) is depicted in the graph below.

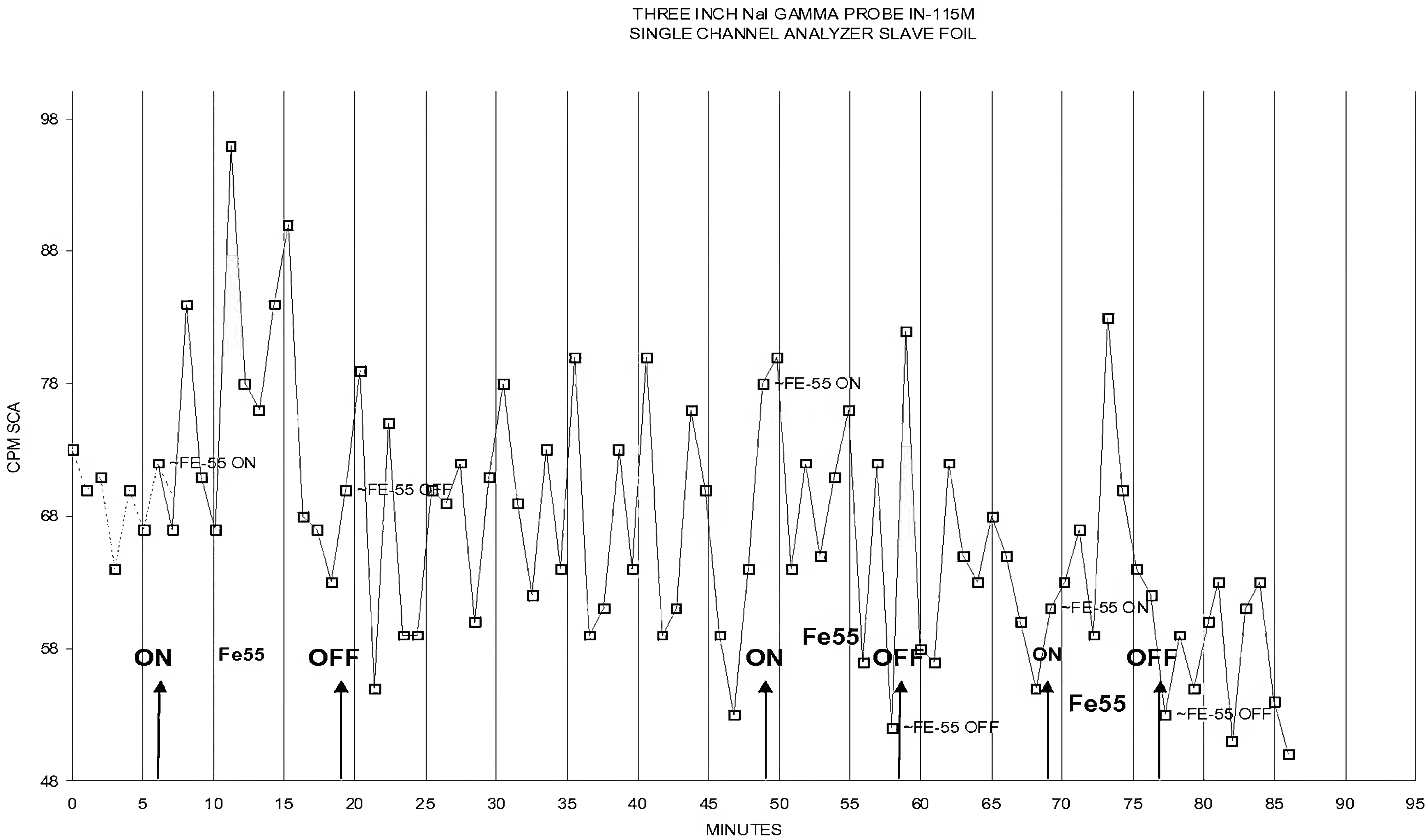

Figure B-1. May 20th, 2004: Quantum communication at 12 meters (raw data) (replication of the December 5th, 2003 setup).

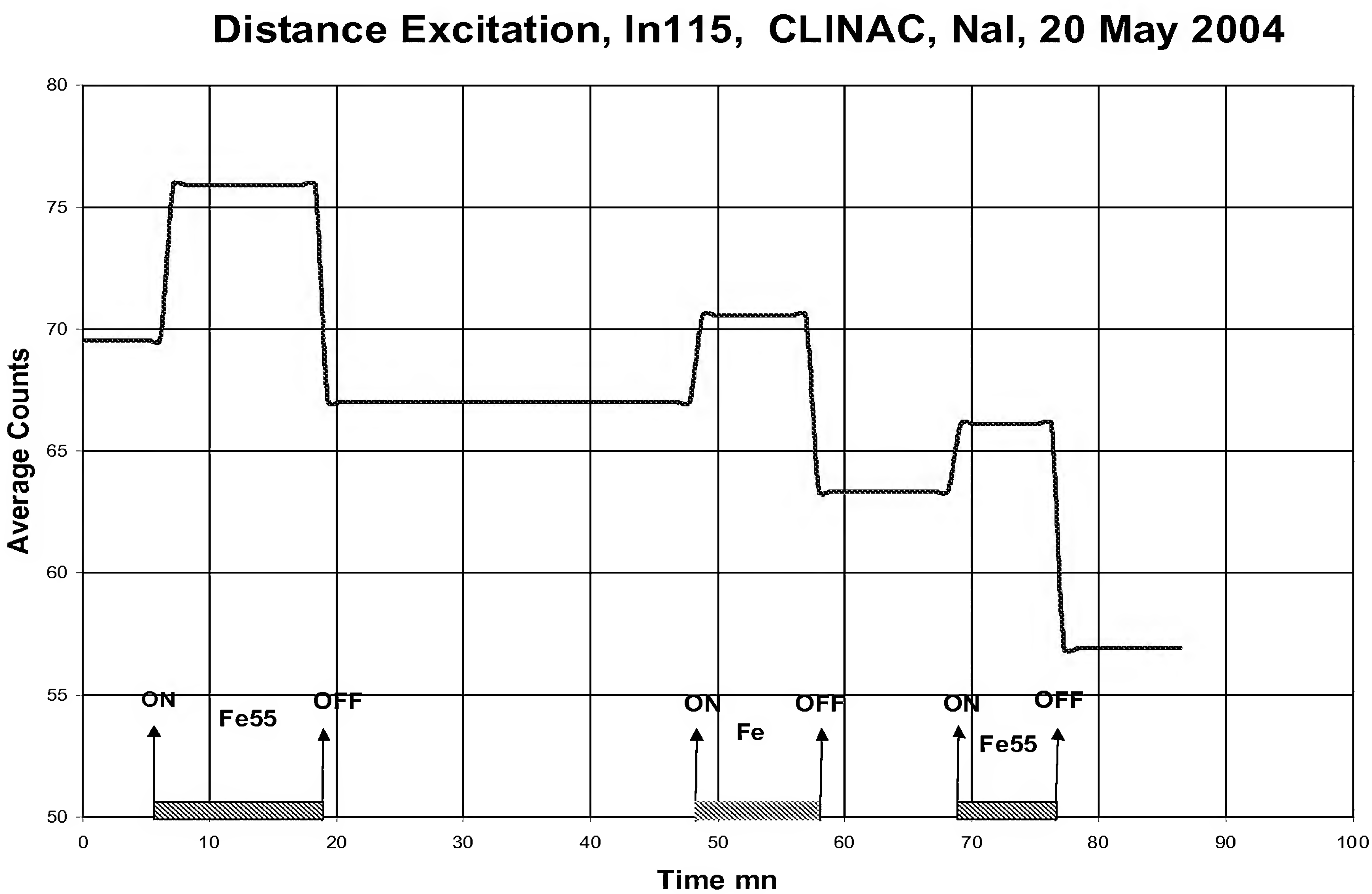

Figure B-2. May 20th, 2004: Quantum communication at 12 meters (N-minutes average over un-stimulated and stimulated intervals) (replication of the December 5th, 2003 setup) .

Table of data:

- Column (1) : Record number.
- Column (2) : Time in minutes (coma is the decimal point).
- Column (2) : Entangled slave Indium foil gamma emission (with remote Induced Gamma Emission).
- Column (3) : Fe-55 stimulation (beginning of stimulation : ON and ending of stimulation : OFF)

Record #	time mn	Stimulat Gamma counts	
1	0	73	
2	1,02	70	
3	2,03	71	
4	3,05	64	
5	4,07	70	
6	5,08	67	
7	6,10	72	FE-55 ON
8	7,12	67	
9	8,13	84	
10	9,15	71	
11	10,17	67	
12	11,18	96	
13	12,20	78	
14	13,22	76	
15	14,23	84	
16	15,25	90	
17	16,27	68	
18	17,28	67	
19	18,30	63	
20	19,32	70	FE-55 OFF
21	20,33	79	
22	21,35	55	
23	22,37	75	
24	23,38	59	
25	24,40	59	
26	25,42	70	
27	26,43	69	
28	27,45	72	
29	28,47	60	
30	29,48	71	
31	30,50	78	
32	31,52	69	
33	32,53	62	
34	33,55	73	
35	34,57	64	
36	35,58	80	
37	36,60	59	
38	37,62	61	
39	38,63	73	
40	39,65	64	

Record #	time mn	Stimulat Gamma counts	
41	40,67	80	
42	41,68	59	
43	42,70	61	
44	43,72	76	
45	44,73	70	
46	45,75	59	
47	46,77	53	
48	47,78	64	
49	48,80	78	FE-55 ON
50	49,82	80	
51	50,83	64	
52	51,85	72	
53	52,87	65	
54	53,88	71	
55	54,90	76	
56	55,92	57	
57	56,93	72	
58	57,95	52	FE-55 OFF
59	58,97	82	
60	59,98	58	
61	61,00	57	
62	62,02	72	
63	63,03	65	
64	64,05	63	
65	65,07	68	
66	66,08	65	
67	67,10	60	
68	68,12	55	
69	69,13	61	FE-55 ON
70	70,15	63	
71	71,17	67	
72	72,18	59	
73	73,20	83	
74	74,22	70	
75	75,23	64	
76	76,25	62	
77	77,27	53	FE-55 OFF
78	78,28	59	
79	79,30	55	
80	80,32	60	
81	81,33	63	
82	82,35	51	
83	83,37	61	
84	84,38	63	
85	85,40	54	
86	86,42	50	

Current statistical analysis of the measurement data with standard deviation:

It is believed that the one skilled in the art of isomer nuclides knows that gamma measurements of the de-excitation of photoactivated In115m foil present a high standard deviation.

In order to assess the likelihood that a quantum transmission did occur during the stimulation periods, the one skilled in the art would compute the trend of the data measured during un-stimulated periods, and than make a simple analysis of the deviation from the trend both for the un-stimulated periods and the stimulated periods.

The trend can be determined over the un-stimulated periods as shown on the figure below:

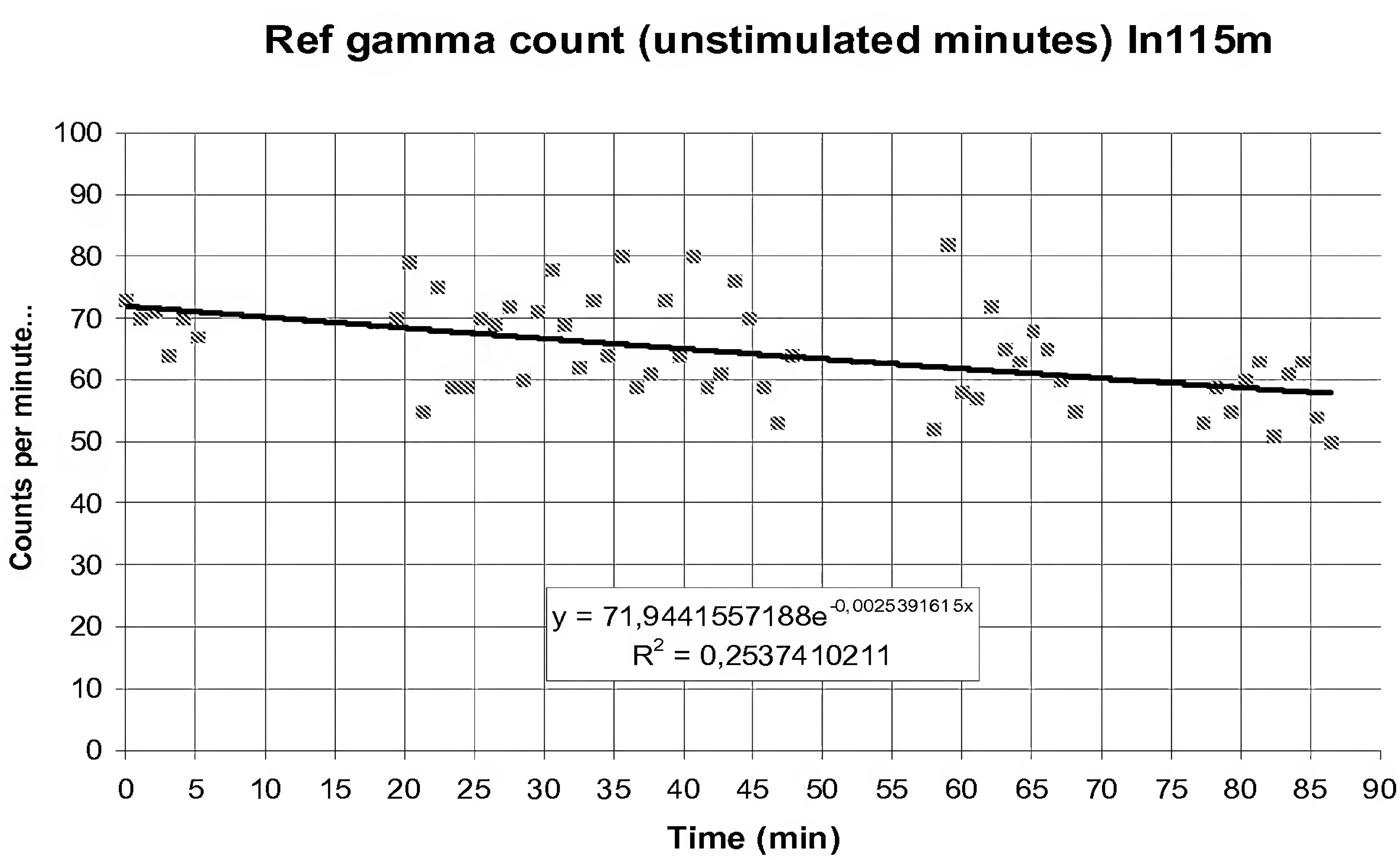

Figure B-3. Trend computed over the measurements of un-stimulated minutes

Hence, the measurements and the trend can be listed for the 86 minutes using the equation shown on Figure B-3:

Minutes	Measures gamma count per minute	Stimulation actions	Trend gamma count per minute
0	73	~FE-55 OFF	71,94
1,02	70		71,76
2,03	71		71,57
3,05	64		71,39
4,07	70		71,21
5,08	67		71,02
6,10	72	~FE-55 ON	70,84
7,12	67		70,66
8,13	84		70,47
9,15	71		70,29
10,17	67		70,11
11,18	96		69,93
12,20	78		69,75
13,22	76		69,57
14,23	84		69,39
15,25	90		69,21
16,27	68		69,03
17,28	67		68,86
18,30	63		68,68
19,32	70	~FE-55 OFF	68,50
20,33	79		68,32
21,35	55		68,15
22,37	75		67,97
23,38	59		67,80
24,40	59		67,62
25,42	70		67,45
26,43	69		67,27
27,45	72		67,10
28,47	60		66,93
29,48	71		66,75
30,50	78		66,58
31,52	69		66,41
32,53	62		66,24
33,55	73		66,07
34,57	64		65,90
35,58	80		65,73
36,60	59		65,56
37,62	61		65,39
38,63	73		65,22
39,65	64		65,05
40,67	80		64,89
41,68	59		64,72
42,70	61		64,55
43,72	76		64,39
44,73	70		64,22
45,75	59		64,05
46,77	53		63,89
47,78	64		63,72

Minutes	Measures gamma count per minute	Stimulation actions	Trend gamma count per minute
48,80	78	~FE-55 ON	63,56
49,82	80		63,40
50,83	64		63,23
51,85	72		63,07
52,87	65		62,91
53,88	71		62,74
54,90	76		62,58
55,92	57		62,42
56,93	72		62,26
57,95	52	~FE-55 OFF	62,10
58,97	82		61,94
59,98	58		61,78
61,00	57		61,62
62,02	72		61,46
63,03	65		61,30
64,05	63		61,15
65,07	68		60,99
66,08	65		60,83
67,10	60		60,67
68,12	55		60,52
69,13	61	~FE-55 ON	60,36
70,15	63		60,21
71,17	67		60,05
72,18	59		59,90
73,20	83		59,74
74,22	70		59,59
75,23	64		59,43
76,25	62		59,28
77,27	53	~FE-55 OFF	59,13
78,28	59		58,98
79,30	55		58,82
80,32	60		58,67
81,33	63		58,52
82,35	51		58,37
83,37	61		58,22
84,38	63		58,07
85,40	54		57,92
86,42	50		57,77

(coma is the decimal point).

It is then possible to compute the deviation from the trend over the N-minutes periods which are stimulated periods or un-stimulated periods:

(coma is the decimal point).

Nr-min Interval number	Interval (in record number) from Record Number	to Record Number	Stimulation	(M) Average Measured gamma count	(T) Average Gamma count trend	Difference between (M) and (T) counts/min over interval	Difference between (M) and (T) ratio
1	1	6	No	69,17	71,48	-2,32	-0,0324
2	7	19	Yes	75,62	69,75	5,86	0,0840
3	20	24	No	67,60	68,15	-0,55	-0,0080
4	25	29	No	66,00	67,27	-1,27	-0,0189
5	30	34	No	70,60	66,41	4,19	0,0631
6	35	39	No	67,40	65,56	1,84	0,0281
7	40	44	No	68,00	64,72	3,28	0,0507

N-min Interval number	Interval (in record number) from Record Number	to Record Number	Stimulation	(M) Average Measured gamma count	(T) Average Gamma count trend	Difference between (M) and (T) counts/min over interval	Difference between (M) and (T) ratio
8	45	48	No	61,50	63,97	-2,47	-0,0386
9	49	57	Yes	70,56	62,91	7,65	0,1216
10	58	62	No	64,20	61,78	2,42	0,0392
11	63	68	No	62,67	60,91	1,76	0,0288
12	69	76	Yes	66,13	59,82	6,31	0,1054
13	77	81	No	58,00	58,82	-0,82	-0,0140
14	82	86	No	55,80	58,07	-2,27	-0,0391

The statistician can easily compute the standard deviation of the un-stimulated intervals deviation ratios from the trend (last column of the above table):

- The standard deviation (sigma) is: 0,0375 (or 3.75%) for un-stimulated intervals.

Hence, it is easy to evaluate a 95% confidence interval of how much the N-minutes stimulated interval values depart from the trend for the N-minutes un-stimulated intervals (refer to Figure B-4 below) and for the 5-minutes stimulated intervals (refer to Figure xxx below). The 95% confidence interval is considered to be at +/- 2 sigma by approximating a normal distribution:

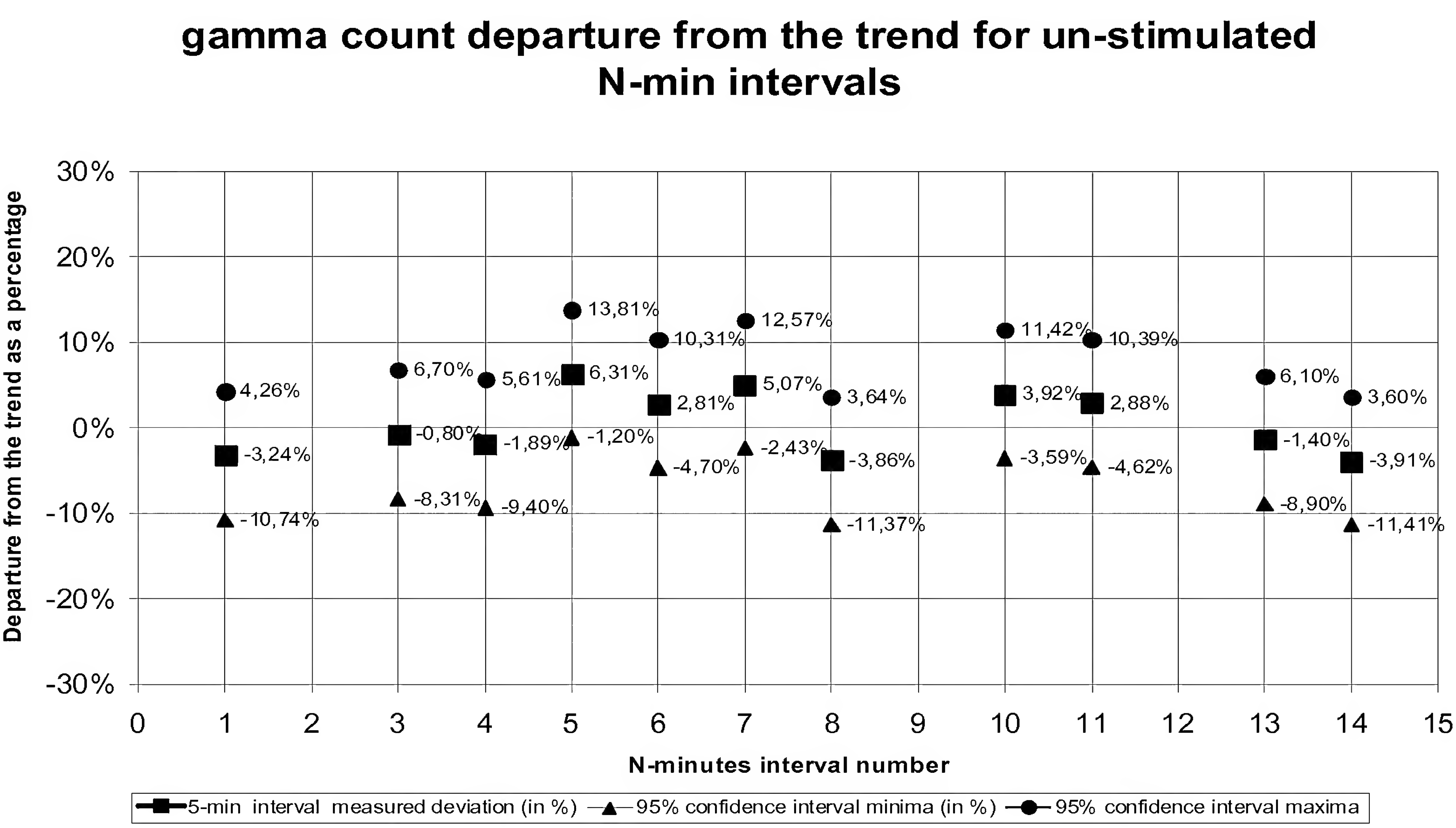

Figure B-4. Gamma count departure for un-stimulated N minute interval.

The non-stimulated intervals essentially provide a reference in order to assess the stimulated intervals as displayed in Figure B-5 below:

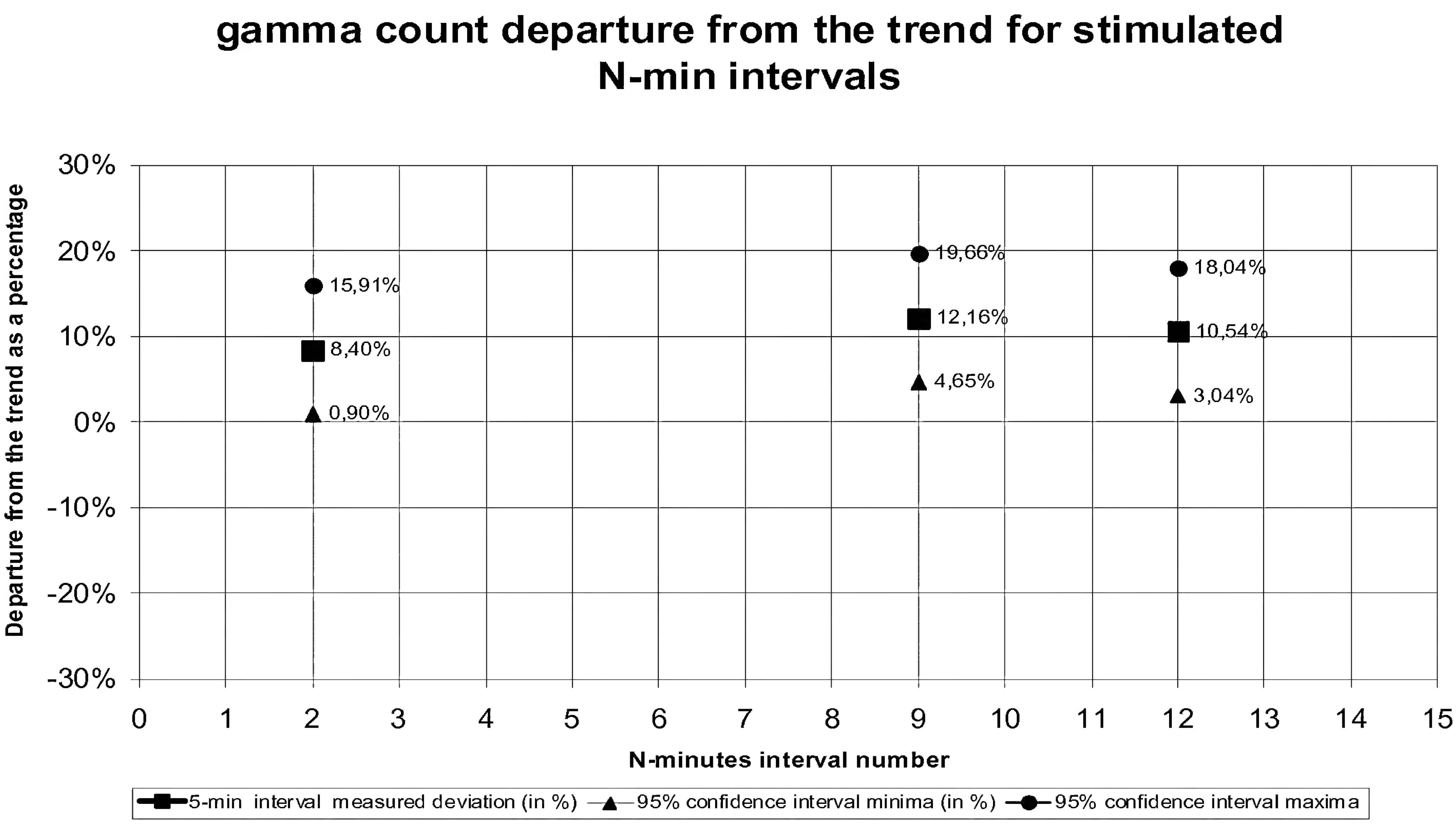

Figure A-6. Gamma count departure for stimulated 5 minute interval.

Conclusion:

The 95% confidence interval suggests that the first two stimulations of N-minute which were applied at intervals 6.1-19.32 minutes and at 48.8-57.9 minutes displayed a departure from the trend which was significant as compared to non-stimulated intervals. The one skilled in the art is able to determine the immediate utility of the invention which can allow for the determining of a quantum communication of an information using the setup. The utility is particularly valuable because the quantum communication can be implemented between any medium as the gamma spectrometer was enclosed in a container having walls made of 0.3 cm of copper and 15 cm of lead and 16 cm of iron.

Appendix C : 37 C.F.R. 1.132 Declaration : Third experimental protocol:

QUANTUM COMMUNICATIONS AT 1600 METERS / Indium foils / Fe-55

May 27th, 2004

The following appendix is a declaration section 37 C.F.R 1.132

I, Robert DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.
I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert DESBRANDES
S-Signed: /Robert DESBRANDES/
Original submitted with my USPTO efiling electronic signature.

The experiment was carried out in Louisiana State University, Baton Rouge, Louisiana on May 27th, 2004.
All the measurements have been done by Professor Daniel Lee VAN GENT, and have been communicated to me. I, Robert DESBRANDES, have made the interpretation of the data presented in this declaration. I have reviewed the statistical analysis made by my son, Franck DESBRANDES.

Experiment comprises the steps of preparing two excited Indium foils (the “entangled” samples) and carrying out the stimulation with Fe-55 :

- Indium foils are prepared together by irradiation using a CLINAC set at 6 MeV, for a total of 20 minutes irradiation.
- The indium foils are separated: one photoactivated indium foil (the master) moved

away by Dr VAN GENT. The other photoactivated indium foil (the slave) is carried over approximately 1300 meters across the campus, then placed in the NaI spectrometer within the laboratory, which was operated by Dr VAN GENT's assistant: Mr. Kiffin Luce : The two Indium foils are about 1600 meters apart during the deexcitation and the measurements:

- ✓ The master Indium foil is locally stimulated by approaching a Fe-55 source (Fe ON tag on Figure below), then removed (end of Fe ON tag) and so on.
- ✓ The slave Indium foil is measured inside a NaI gamma spectrometer (336 keV channel) : The 336 keV gamma count of this Indium foil (which is not stimulated) is depicted in the graph below.

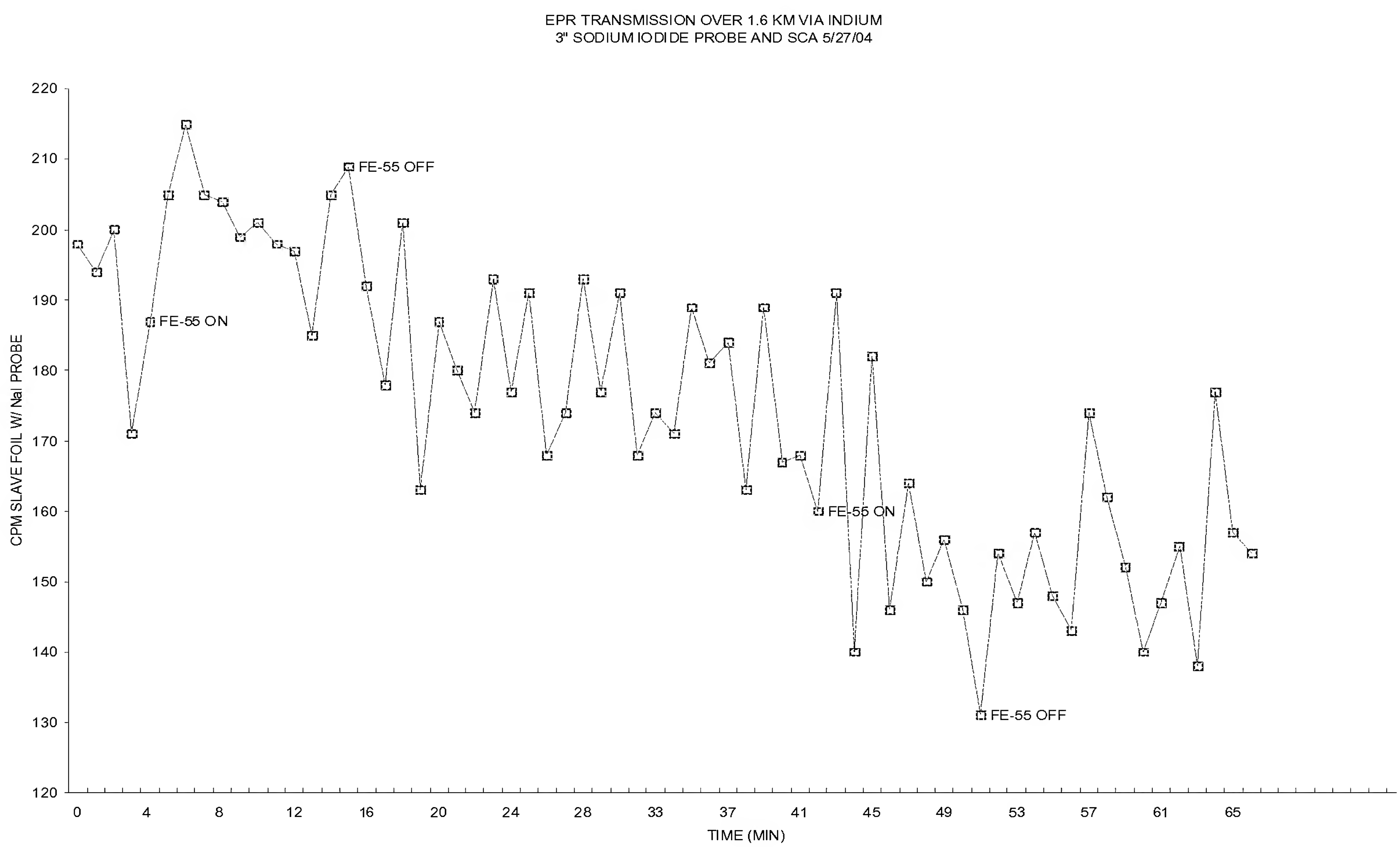

Figure C-1. Quantum communication at 1600 meters (raw data).

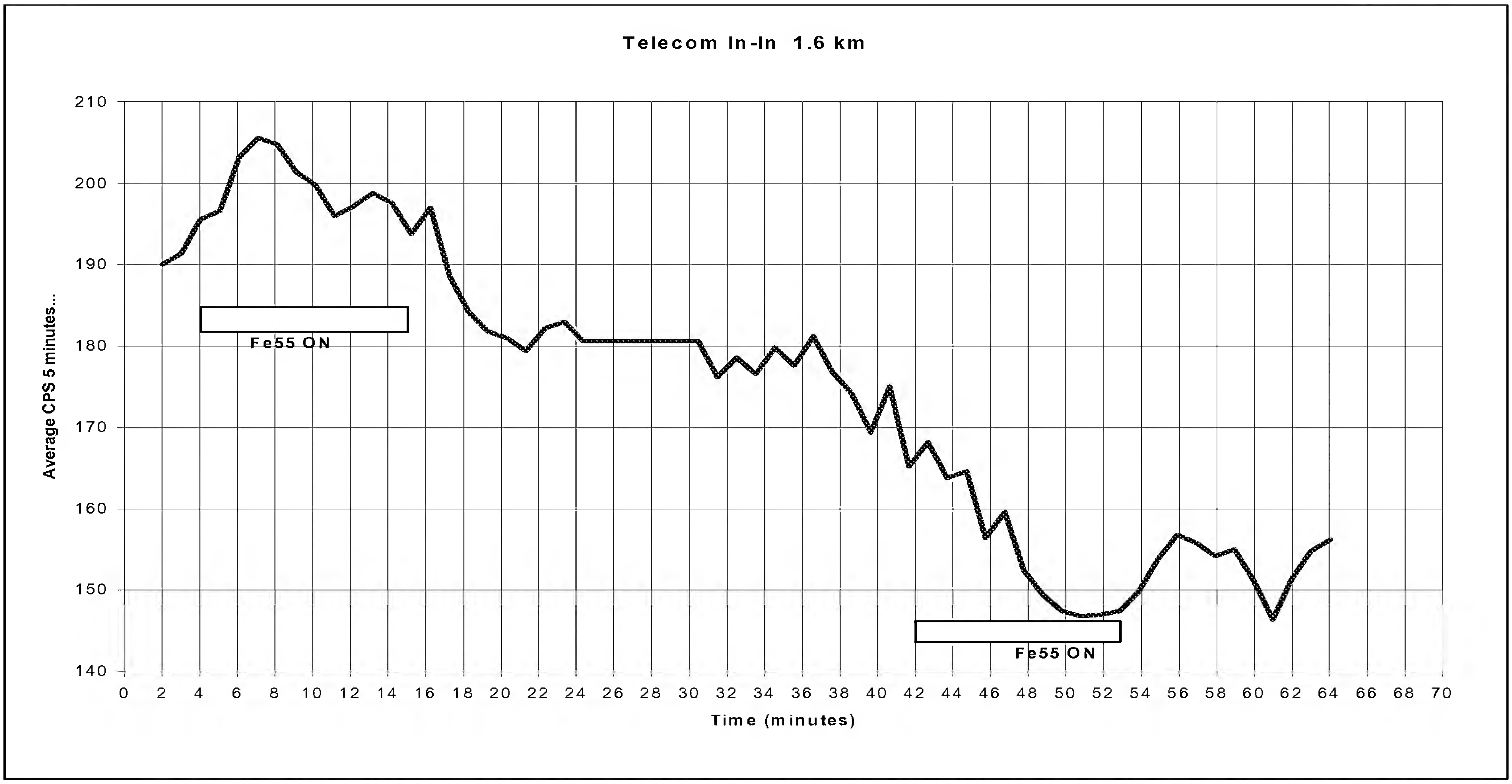

Figure C-2. Quantum communication at 1600 meters (5-minutes moving average).

Current statistical analysis of the measurement data with standard deviation:

It is believed that the one skilled in the art of isomer nuclides knows that gamma measurements of the de-excitation of photoactivated In115m sheet present a high standard deviation.

In order to assess the likelihood that a quantum transmission did occur during the stimulation periods, the one skilled in the art would compute the trend of the data measured during un-stimulated periods, and than make a simple analysis of the deviation from the trend both for the un-stimulated periods and the stimulated periods.

The trend can be determined over the un-stimulated periods as shown on the figure below:

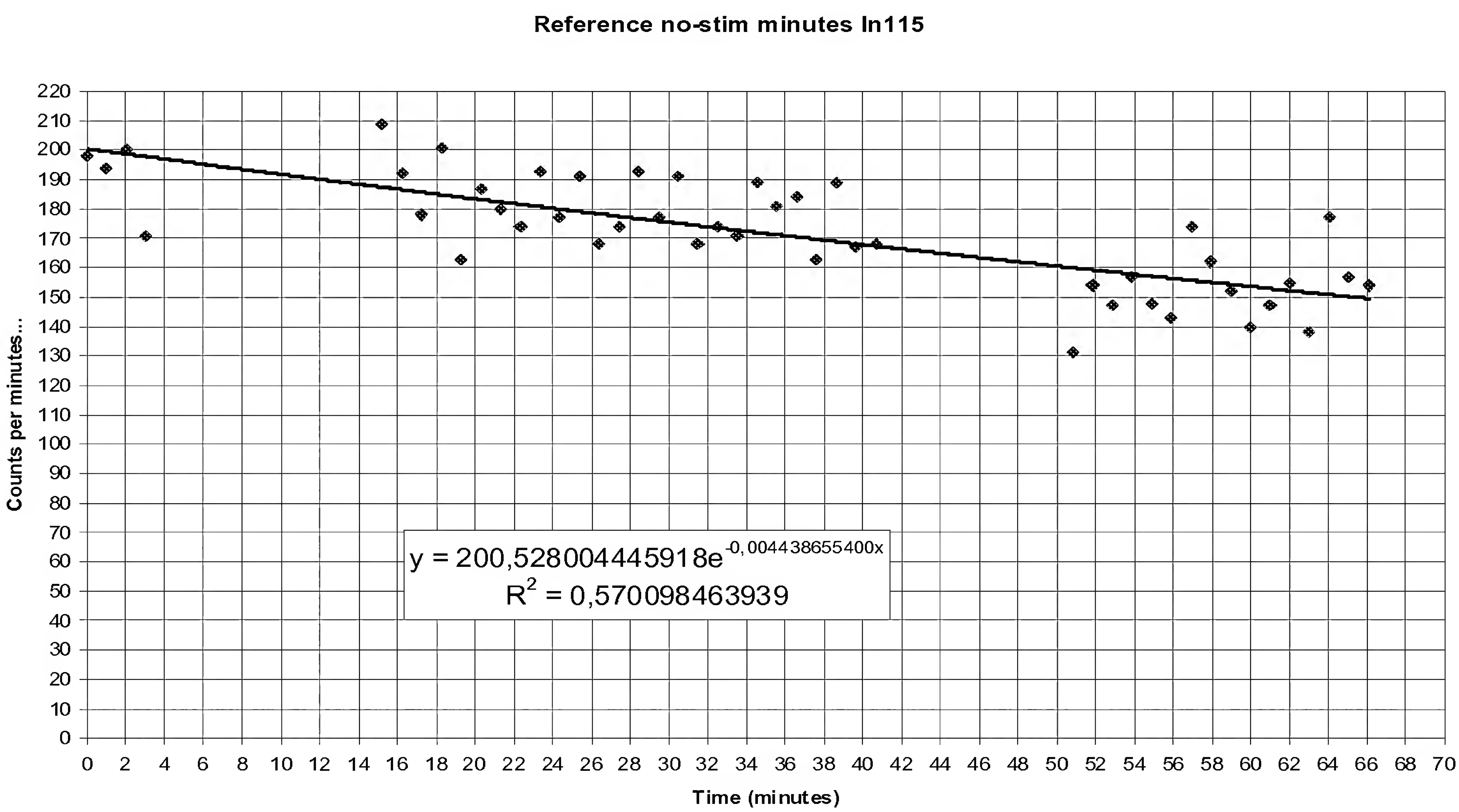

Figure C-3. Trend computed over the measurements of un-stimulated minutes

Hence, the measurements and the trend can be listed for the 46 minutes using the equation shown on Figure 1:

Table of data:

- Column (1) : Time in minutes.
- Column (2) : Entangled slave Indium foil gamma emission (with remote Induced Gamma Emission).
- Column (3) : Fe-55 stimulation (beginning of stimulation : ON and ending of stimulation : OFF)
- Column (4) : Trend computed using data for un-stimulated minutes.

Minutes	Measures gamma count perminute	Stimulation actions	Trend gamma count perminute
0	198	FE-55 OFF	200,53
1	194		199,64
2	200		198,74
3	171		197,85
4	187	FE-55 ON	196,96
5	205		196,07
6	215		195,19
7	205		194,31
8	204		193,43
9	199		192,56
10	201		191,69
11	198		190,83
12	197		189,97
13	185		189,12
14	205		188,27
15	209	FE-55 OFF	187,42
16	192		186,57
17	178		185,73
18	201		184,90
19	163		184,06
20	187		183,24
21	180		182,41
22	174		181,59
23	193		180,77
24	177		179,96
25	191		179,15
26	168		178,34
27	174		177,54
28	193		176,74
29	177		175,94
30	191		175,15
32	168		174,36
33	174		173,58
34	171		172,80
35	189		172,02
36	181		171,24
37	184		170,47
38	163		169,70
39	189		168,94
40	167		168,18
41	168		167,42

Minutes	Measures gamma count perminute	Stimulation actions	Trend gamma count perminute
42	160	FE-55 ON	166,67
43	191		165,92
44	140		165,17
45	182		164,43
46	146		163,69
47	164		162,95
48	150		162,22
49	156		161,49
50	146		160,76
51	131	FE-55 OFF	160,04
52	154		159,32
53	147		158,60
54	157		157,88
55	148		157,17
56	143		156,47
57	174		155,76
58	162		155,06
59	152		154,36
60	140		153,67
61	147		152,97
62	155		152,29
63	138		151,60
64	177		150,92
65	157		150,24
66	154		149,56

(coma is the decimal point).

It is then possible to compute the deviation from the trend over the N-minutes periods which are either a stimulated period or a non-stimulated period:

N-min Interval number	Interval (in minutes) from	to	Stimulation	(M) Average Measured gamma count	(T) Average Gamma count trend	Difference between (M) and (T) counts/min over interval	Difference between (M) and (T) ratio
1	0	3	No	190,75	199,19	-8,44	-0,0424
2	4	8	Yes	200,09	192,58	7,51	0,0390
3	15	19	No	188,60	185,74	2,86	0,0154
4	20	24	No	182,20	181,59	0,61	0,0033
5	25	29	No	180,60	177,54	3,06	0,0172
6	30	35	No	178,60	173,58	5,02	0,0289
7	36	41	No	175,33	169,33	6,01	0,0355
8	42	46	Yes	159,44	163,70	-4,25	-0,0260
9	51	55	No	147,40	158,60	-11,20	-0,0706
10	56	60	No	154,20	155,06	-0,86	-0,0056
11	61	66	No	154,67	151,26	3,40	0,0225

(coma is the decimal point).

The statistician can easily compute the standard deviation of the un-stimulated intervals deviation ratios from the trend (last column of the above table):

- The standard deviation (sigma) is: 0.035279879 (or 3.53%) for un-stimulated intervals.

Hence, it is easy to evaluate a 66% confidence interval of how much the N-minutes stimulated interval values depart from the trend for the un-stimulated intervals (refer to Figure C-4 below) and for the N-minutes stimulated intervals (refer to Figure C-5 below). The 66% confidence interval is considered to be at +/- 1 sigma by approximating a normal distribution:

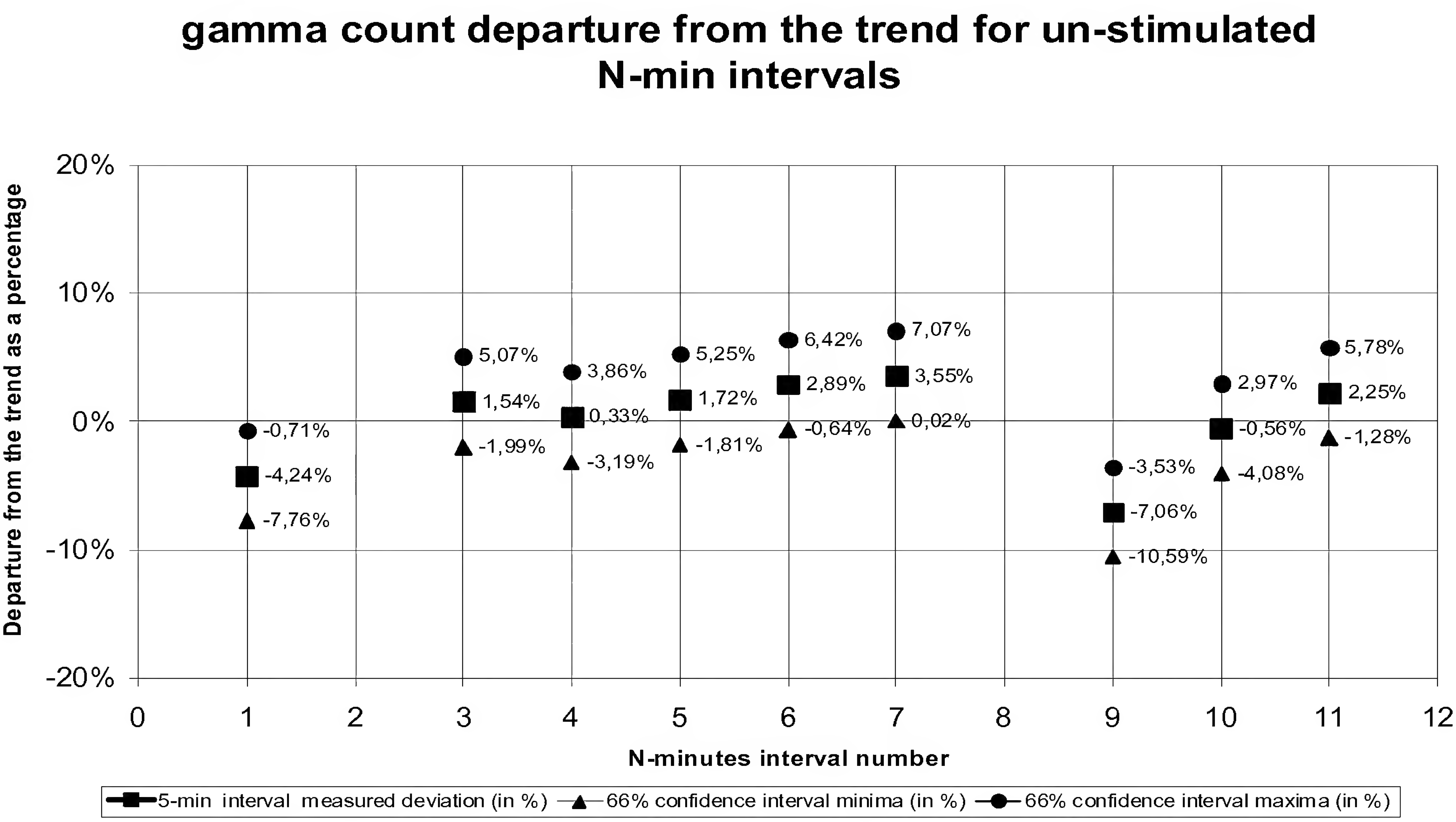

Figure C-4. Gamma count departure for un-stimulated N-minute intervals.

The non-stimulated intervals essentially provide a reference in order to assess the stimulated intervals as displayed in Figure C-5 below:

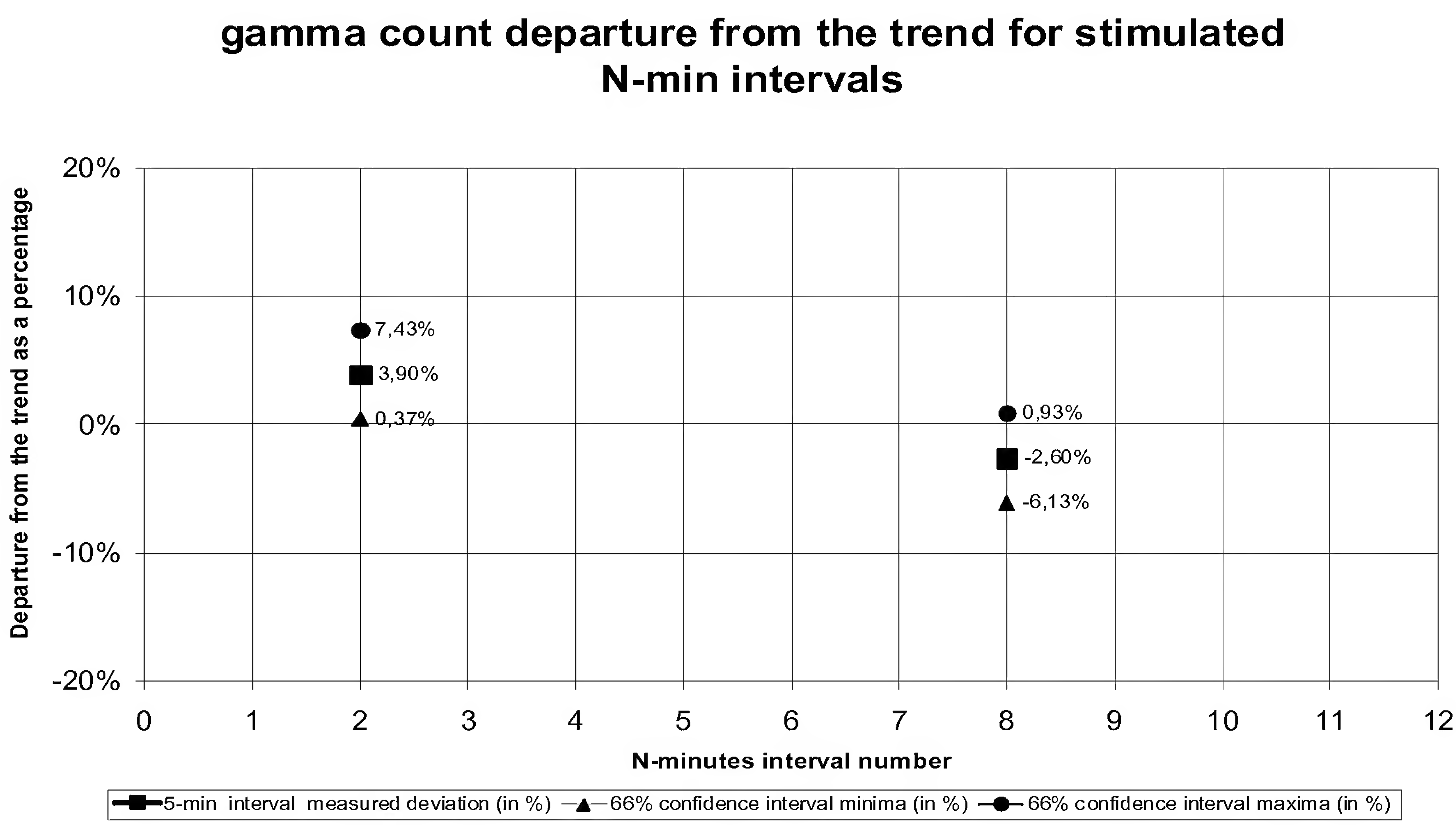

Figure C-5. Gamma count departure for stimulated N-minute intervals.

Conclusion:

The 66% confidence interval suggests that the first stimulations of N-minute which was applied at interval number 2 [4-8 minutes] displayed a departure from the trend which was significant as compared to non-stimulated intervals. The second stimulated interval number 8 presents a departure which is not significant.

This protocol provides for mixed statistical results due to the variation in interval lengths and to the data.

Appendix D : 37 C.F.R. 1.132 Declaration :

Experiments of Direct Induced Gamma Emission (IGE) of Indium 115m

The following appendix is a declaration section 37 C.F.R 1.132

I, Robert DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.
I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert DESBRANDES
S-Signed: /Robert DESBRANDES/
Original submitted with my USPTO efiling electronic signature.

The following measurements were done by Professor VAN GENT and communicated to me.

In the following measurements 115In foils were photoactivated using a CLINAC producing accelerated electrons of 6 MeV
Direct Induced Gamma Emission (IGE) is illustrated, i.e. the measurement of deexcitation on a locally stimulated Indium sample:

We have tested direct IGE using different sources:

- Fe 55
- Americium 241
- Strontium 90

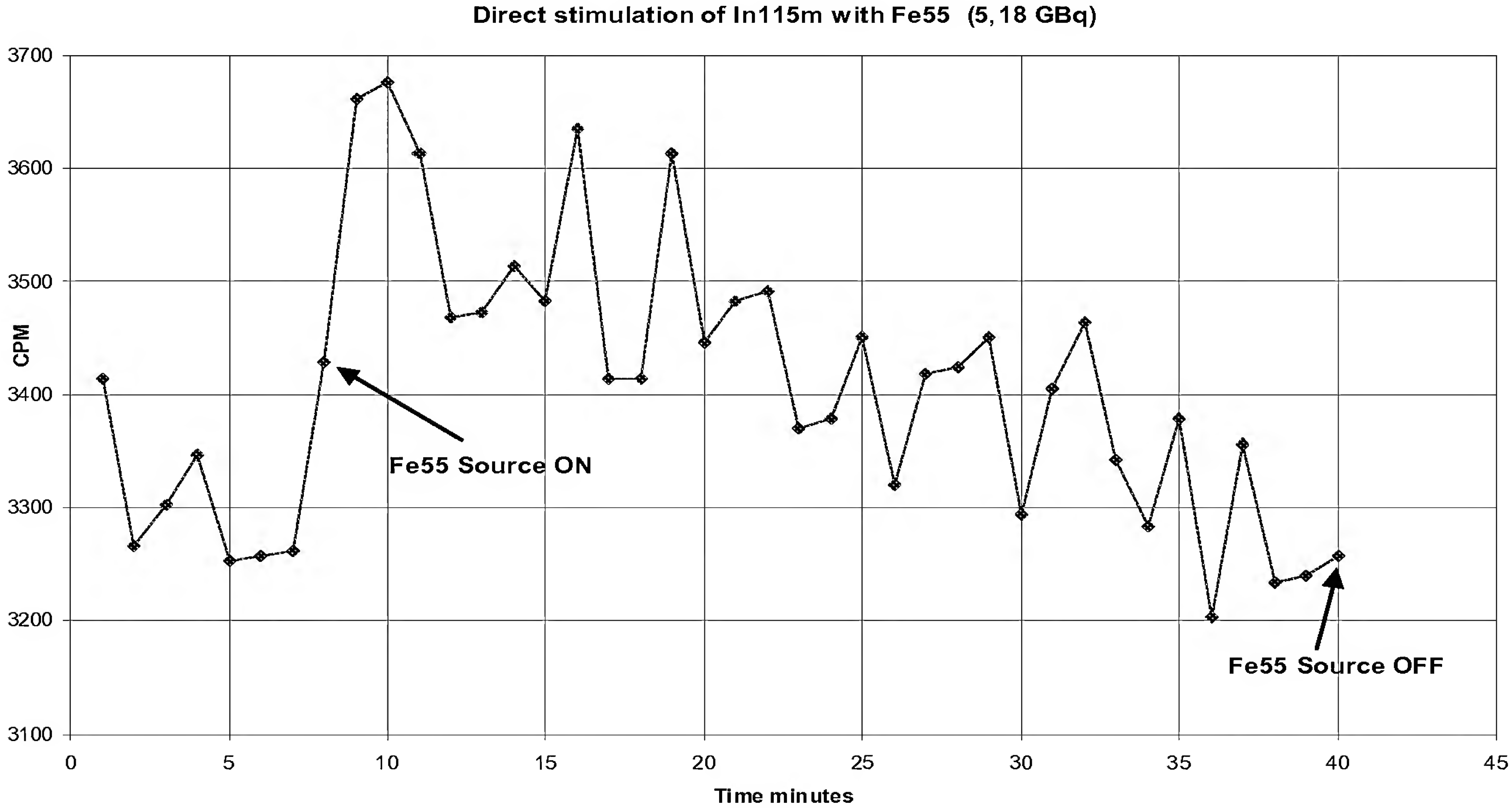

Figure 2. Direct stimulation of Indium 115m with Fe 55.

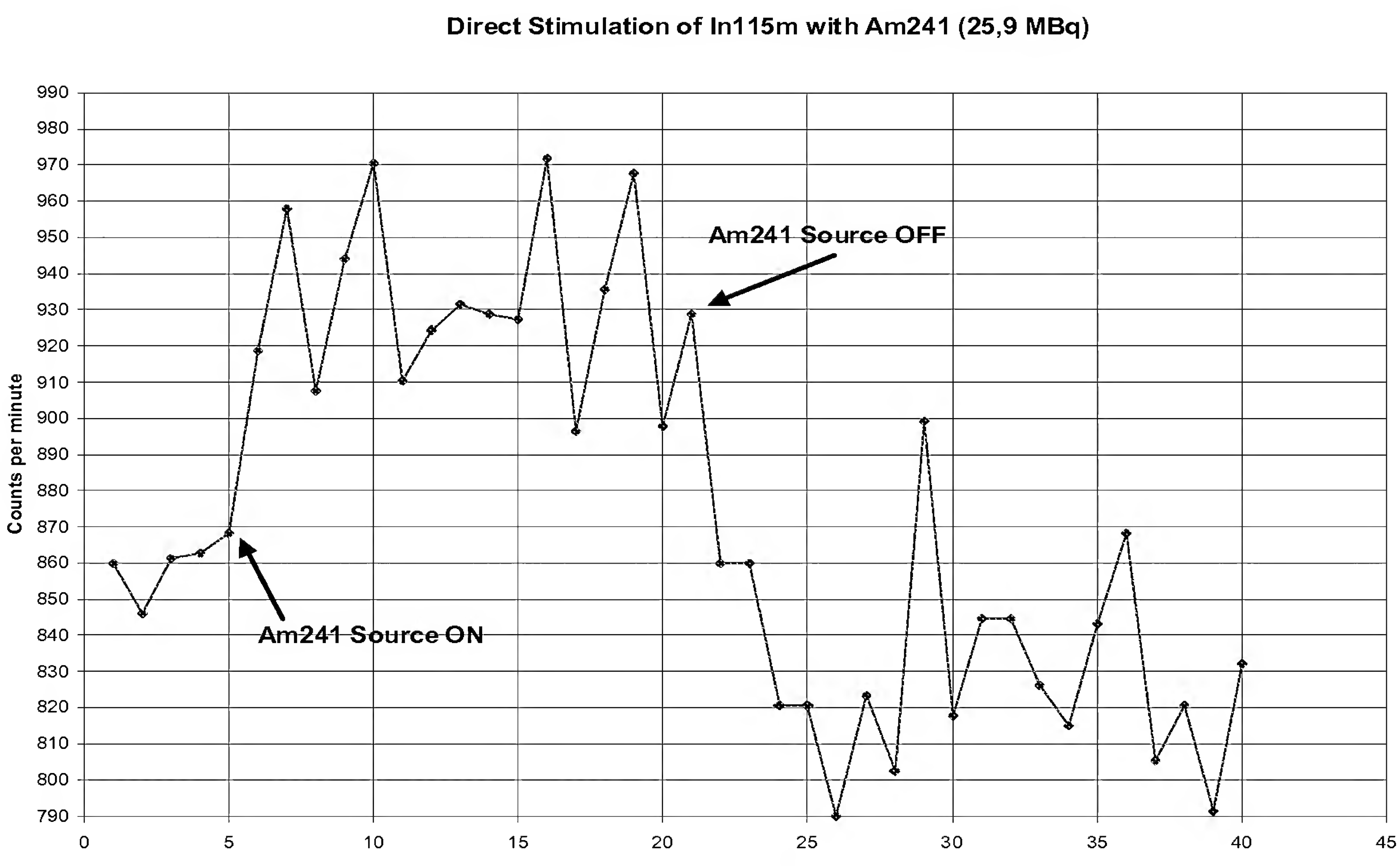

Figure 3. Direct stimulation of Indium 115m with Americium 241.

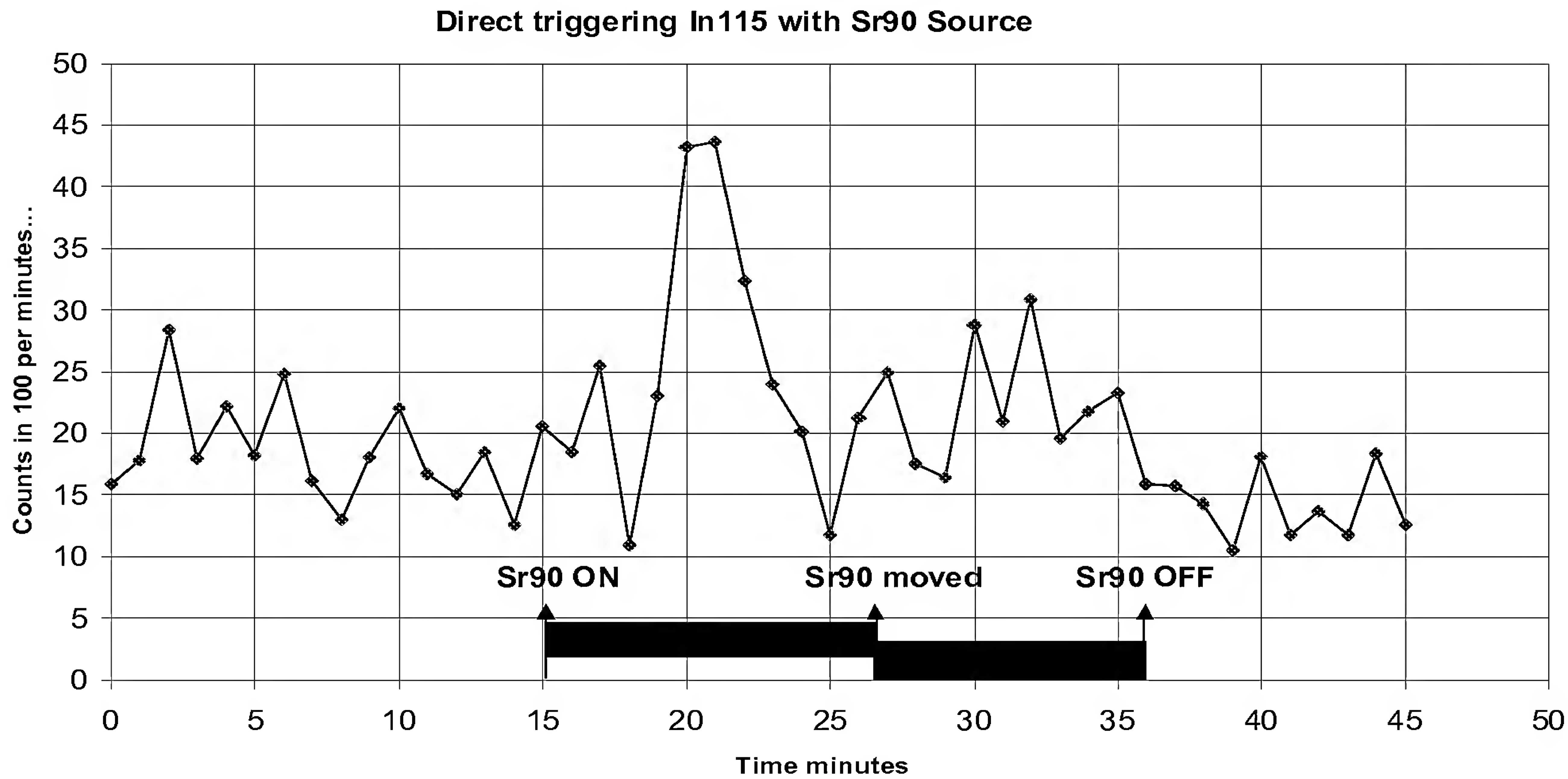

Figure 4. Direct stimulation of Indium 115m with Strontium 90.

Appendix E : 37 C.F.R. 1.132 Declaration :

Experimental protocol: QUANTUM COMMUNICATIONS AT 12 METERS / Indium foils / Sr-90 : January 16th, 2003

The following Appendix is a declaration section 37 C.F.R 1.132

I, Robert DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.
I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert DESBRANDES
S-Signed: /Robert DESBRANDES/
Original submitted with my USPTO efiling electronic signature.

The following measurements were done by Professor VAN GENT and communicated to me.

The experiment was carried out in Louisiana State University, Baton Rouge, Louisiana on January 16th, 2004.
All the measurements and interpretation have been done by Professor Daniel Lee VAN GENT. The statistical analysis has not been done.

Experiment comprises the steps of preparing five excited Indium foils (the “entangled” samples) and carrying out the stimulation with Sr-90 :

- Five Indium foils are prepared together by irradiation using a CLINAC set at 6 MeV, for a total of 20 minutes irradiation.
- The indium foils are carried over approximately 1300 meters across the campus,

then separated and placed in apparatuses in two adjacent laboratories 12 meters away: Two Indium foils are placed about 12 meters apart during the IGE de-excitation of the master, and the measurements of the slave:

- ✓ One Indium foil (the "master" sample) is locally stimulated by approaching a Sr-90 source (ON tag on Figure below), then removed (end of ON tag) and so on.
- ✓ The other distant Indium foils (the "slave" sample) is measured inside a NaI gamma spectrometer (336 keV channel) : The 336 keV gamma count of this distant Indium foil (which is not stimulated) is depicted in the graph below.

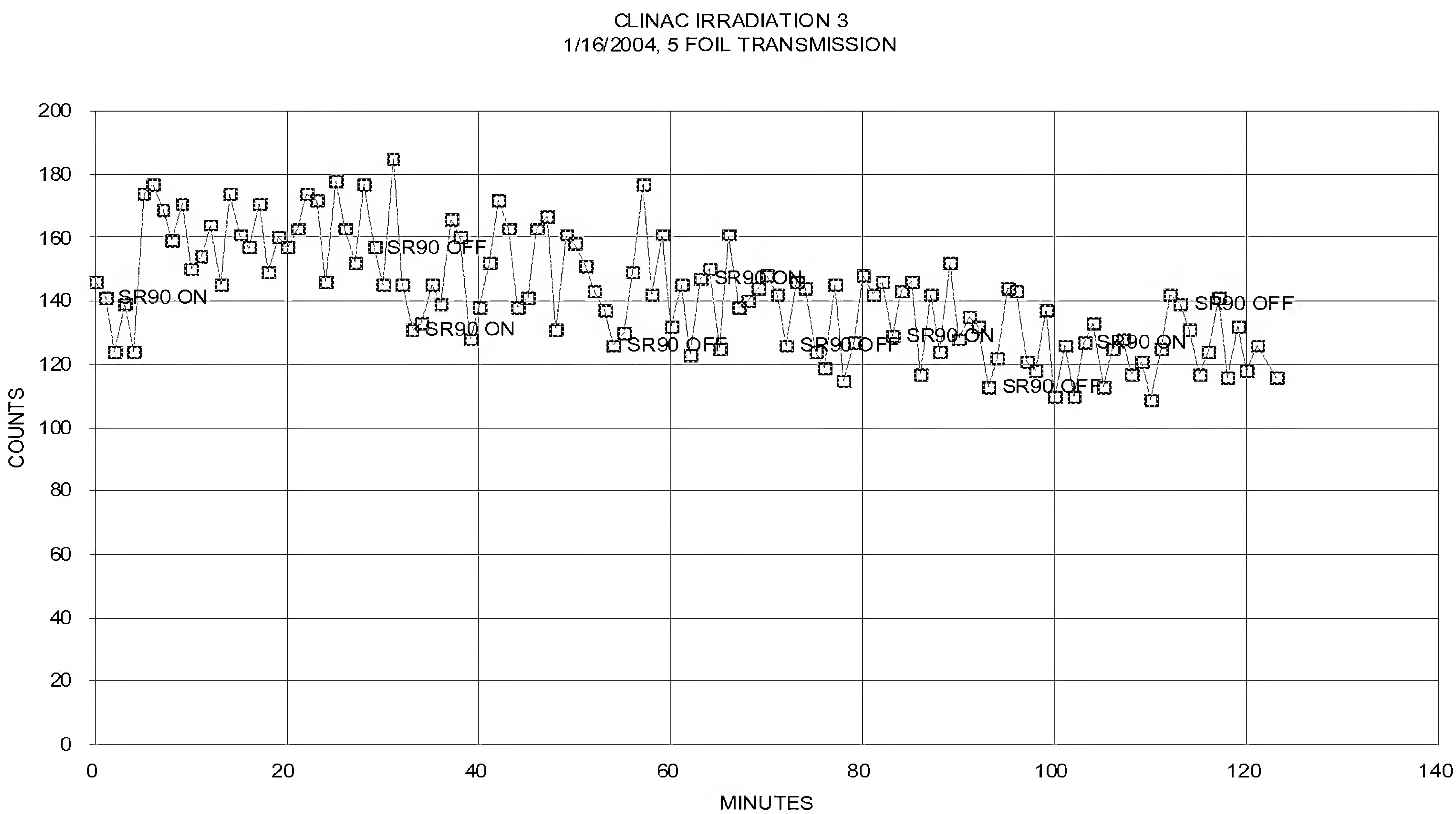

Figure E-1. January 16th, 2004: Quantum communication at 12 meters (raw data).

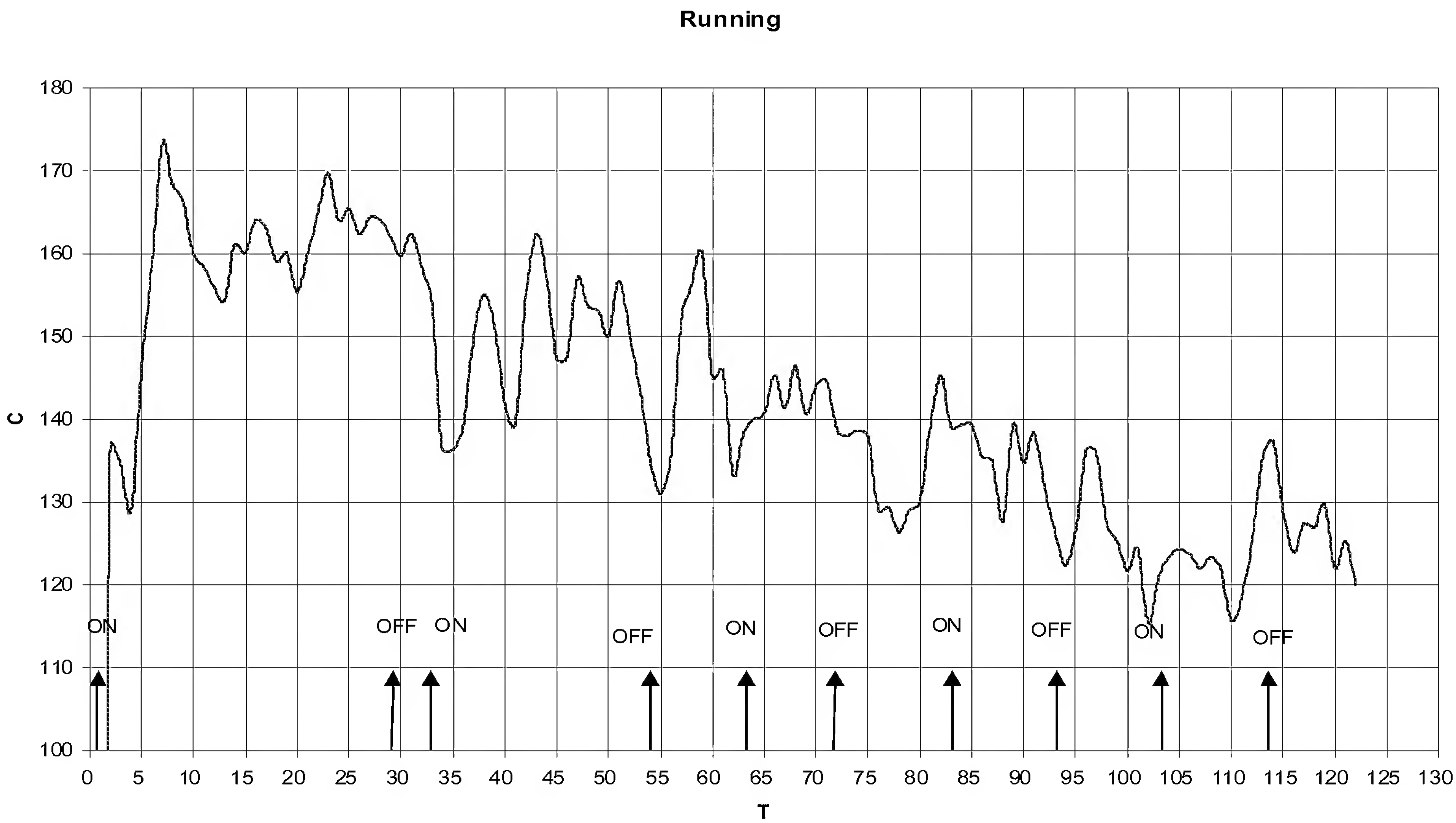

Figure E-2. January 16th, 2004: Quantum communication at 12 meters (N-minutes moving average).

The results are mixed. It is considered that the experiment protocol was uncertain and too complex: the un-stimulated intervals are two short to provide for computing an average, while the stimulated intervals were too long probably producing an early emptying of all entangled 115In nuclei during the first 30 minutes

Table of data:

- Column (1) : Time in minutes.
- Column (3) : Sr-90 stimulation (beginning of stimulation : ON and ending of stimulation : OFF)
- Column (5) : Entangled slave Indium foil gamma emission (with remote Induced Gamma Emission).
- Column (6) : 3-minutes past moving average of column (5).

CLINAC IRRADIATION 3,1/16/2004 FIVE FOIL IRRADITION TRANSMISSION					
Time min				Gamma	Running
0				146	Average
1		SR90 ON		141	3 cnts past
2				124	137
3				139	135
4				124	129
5				174	146
6				177	158
7				169	173
8				159	168
9				171	166
10				150	160
11				154	158
12				164	156
13				145	154
14				174	161
15				161	160
16				157	164
17				171	163
18				149	159
19				160	160
20				157	155
21				163	160
22				174	165
23				172	170
24				146	164
25				178	165
26				163	162
27				152	164
28				177	164
29		SR90 OFF		157	162
30				145	160
31				185	162
32				145	158
33		SR90 ON		131	154
34				133	136
35				145	136
36				139	139
37				166	150
38				160	155
39				128	151
40				138	142
41				152	139
42				172	154
43				163	162
44				138	158
45				141	147
46				163	147
47				167	157
48				131	154
49				161	153
50				158	150

51				151	157
52				143	151
53				137	144
54		SR90OFF		126	135
55				130	131
56				149	135
57				177	152
58				142	156
59				161	160
60				132	145
61				145	146
62				123	133
63		SR90ON		147	138
64				150	140
65				125	141
66				161	145
67				138	141
68				140	146
69				144	141
70				148	144
71				142	145
72		SR90OFF		126	139
73				146	138
74				144	139
75				124	138
76				119	129
77				145	129
78				115	126
79				127	129
80				148	130
81				142	139
82				146	145
83		SR90ON		129	139
84				143	139
85				146	139
86				117	135
87				142	135
88				124	128
89				152	139
90				128	135
91				135	138
92				132	132
93		SR90OFF		113	127
94				122	122
95				144	126
96				143	136
97				121	136
98				118	127
99				137	125
100				110	122
101				126	124
102				110	115
103		SR90ON		127	121
104				133	123
105				113	124
106				125	124
107				128	122
108				117	123
109				121	122
110				109	116
111				125	118
112				142	125
113		SR90OFF		139	135
114				131	137
115				117	129
116				124	124
117				141	127
118				116	127
119				132	130
120				118	122
121				126	125
122				116	120

Appendix F : 37 C.F.R. 1.132 Declaration : Publication :

Remote Stimulated Triggering of Quantum Entangled Nuclear Metastable States of Indium 115m

[arXiv:nucl-ex/0411050v1]

The following appendix is a declaration section 37 C.F.R 1.132

I, Robert DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.
I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

Robert DESBRANDES
S-Signed: /Robert DESBRANDES/
Original submitted with my USPTO efiling electronic signature.

The following article referenced [arXiv:nucl-ex/0411050v1] authored by Professor VAN GENT was published on November 24th, 2004. The content is a description of the setups presented in Appendix A and B. The setup of Appendix C is mentioned, but not presented.

Remote Stimulated Triggering of Quantum Entangled Nuclear Metastable States of ^{115m}In

D. L. Van Gent, Nuclear Science Center, Louisiana State University, Baton Rouge, USA

PACS Ref: 03.67 Mn;

Abstract

We report experiments in which two indium foils were quantum entangled via photoexcitation of stable ^{115}In to radioactive ^{115m}In by utilizing Bremsstrahlung gamma photons produced by a Varian Compact Linear Accelerator (CLINAC). After photo-excitation, remote triggering of the "master" foil with low energy gamma photons, yielded stimulated emissions of 336 keV gamma photons from quantum entangled ^{115m}In in the "slave" foil located up to 1600 m away from the "master" foil. These experiments strongly demonstrate that useful quantum information can be transferred through quantum channels via modulation of quantum noise (accelerated radioactive decay of ^{115m}In metastable nuclei). Thus, this modality of QE transmission is fundamentally different from optical QE information transfer via quantum entangled space "q-bits" as developed by information theorists for quantum channel information transfer. Additionally, there is no obvious potential for signal degradation with increasing distance nor the problems associated with misalignment of optical information transfer systems

1. Introduction

The possibility of instantaneous transfer of quantum information over macroscopic distances was first alluded to by Einstein, Podolsky, and Rosen [1]. They wrote with strong conviction that General Relativity and QED are fundamentally at odds with each other in this respect, since QED seems to indicate the possibility of "instantaneous" transfer of quantum information over long distances. According to QED theory, it should be possible to send quantum-encoded (polarized) photons through optical transfer media, allowing instantaneous transfer of quantum information in direct contradiction to General Relativity (GR). Currently, Information Theory experts generally agree that it is doubtful that useful information can be transmitted faster than light via QE photons [2], but it is widely acknowledged that, in theory, quantum noise can be transferred instantaneously to any point in the universe via QE systems.

Several experiments carried out in the last decade strongly demonstrate the validity of quantum entanglement of photons over macroscopic distances, most recently at 100 km. In 2003, Andrew Shields [3] and his colleagues at Toshiba Research Europe Ltd. (Cambridge, UK) carried out quantum cryptography experiments by encoding information in the polarization of individual photons sent over 100 km of optical fiber, breaking an earlier record by about 40 km. However, for a variety of reasons, photons are less and less likely to be detectable the farther they travel.

Difficulties that must be overcome if such optically-based information transfer technologies are to become practical and commercially viable are common to all optical communication modalities, such as requisite precise optical system alignment, accurate timing necessary for encoded photon packet reception, photon signal degradation, and environmental zero point vacuum flux induced de-coherence of "unprotected" quantum entangled systems over distance and time (O'Connel, 2002)[4]. Optical technologies developed for this purpose thus far allow for only very limited applications of quantum channel transmissions.

We have previously reported [5] strong evidence that high-energy gamma and Bremsstrahlung quantum entangled photons can be transferred for extended periods of time into nuclear radioactive metastable nuclear states of certain photo-excited metals. Paired QE nucleonic metastable states must conform to quantum spin and angular momentum conservation laws even when separated by macroscopic distances similar to QE paired photons.

The relatively new field of study pertaining to nuclear photon pumping into metastable nucleii and subsequent direct "triggering" for release of gamma photon energy of isomers has been coined, "Nucleonics" [6] being essentially the nuclear analog to the field of "electronics." DOE funded work is currently ongoing with the desired end result being the storage and release of Giga joules/gm of the most promising isomer ^{178m2}Hf with a half-life of gamma decay of 31 years [7].

2. Methodology

It is well known that low energy photon pairs from atomic radiative cascade are entangled [8]. In the experiments reported here, entangled gamma photons were produced from both radio-isotopic ^{60}Co nuclear decay and CLINAC Compact Linear Accelerator indium metal foil irradiation. The quantum entanglement of high energy gamma and Bremsstrahlung photons can be transferred via nucleonic photon pumping of metastable nuclei.

In this experiment, two identical 5x5 cm 0.25 mm thick 99.999% pure natural indium were photo-excited for various lengths of time together aligned in the same plane either in the HICS irradiation chamber for 30 hours or with the CLINAC accelerator Bremsstrahlung beam for 20 minutes. Figure 1 depicts a conceptual rendering of the experimental design for CLINAC irradiation of the indium foils.

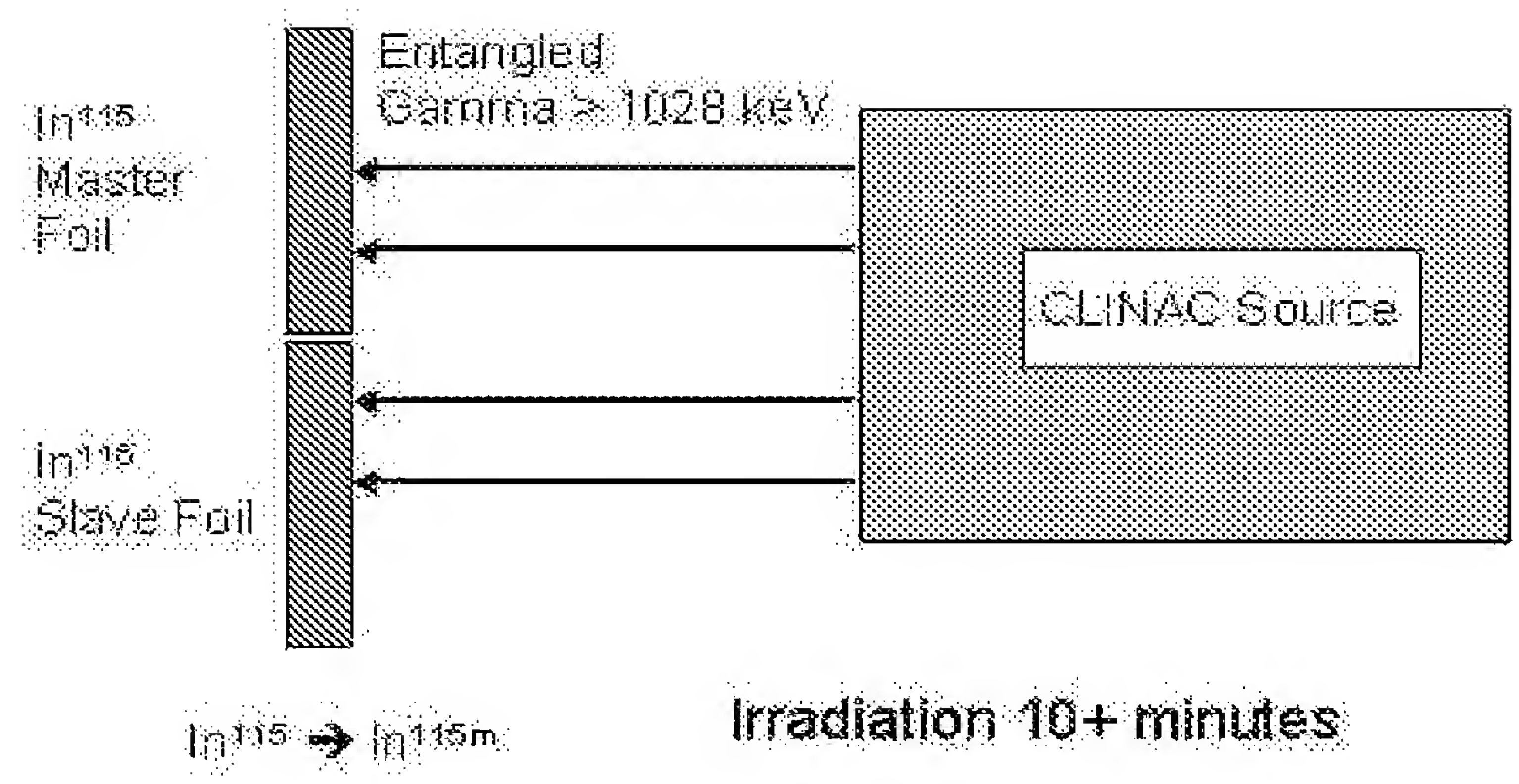

Figure 1. CLINAC photo-excitation of two indium foils

During gamma counting of the resulting photo-excited indium foils with a Canberra high purity intrinsic germanium gamma spectrometer interfaced with a multichannel analyzer, we observed a direct correlation between two entangled foils during spontaneous decay. Further investigation revealed that direct triggering of one of the QE paired foils with low-energy gamma photons resulted in an indirect correlated emission from the second foil located at a distance of at least 12 meters and separated by 15 cm of lead. The experimental design is depicted in Figure 2.

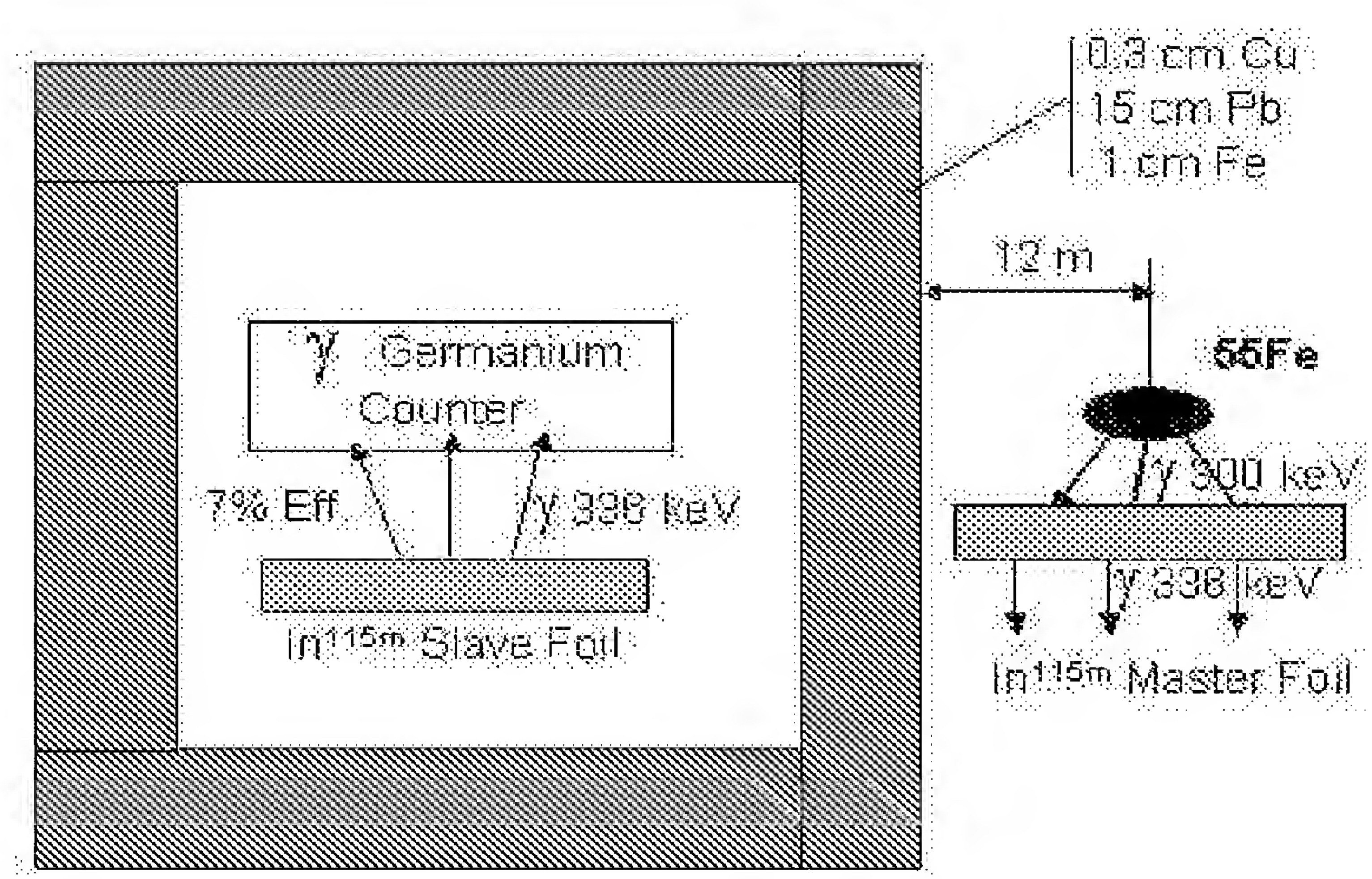

Figure 2. Experimental design of remote gamma triggering with two indium foils

3. Results

During the remote triggering experiments, HICS irradiated indium foils yielded statistically insignificant remote gamma triggered photons because HICS

irradiated indium foils evidence QE ^{115m}In states of only 3.5% QE doublets. Therefore, we did not attempt remote triggering experiments with HICS irradiated indium foils.

CLINAC irradiated indium foils yielded statistically significant remote triggered gamma photons based on the fact that 9% of metastable ^{115m}In are QE doublets and 9% are QE triplets.

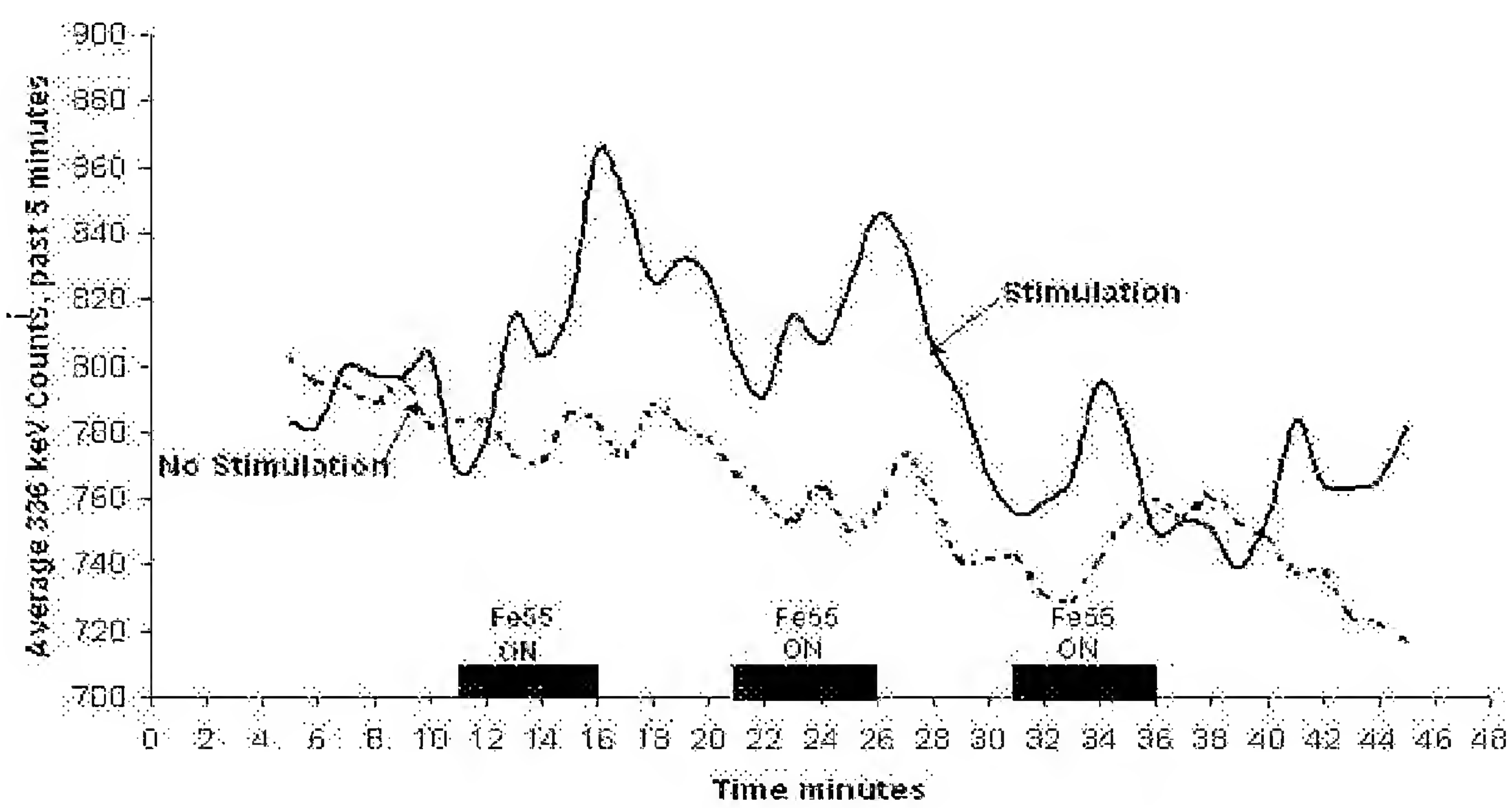

Figure 3. Graph of remote triggering of CLINAC photo-excited indium foils at 12 meters as compared to CLINAC photo-excited indium foils with no stimulation. Germanium counter.

A typical last five minute running average of one minute gamma counts of the "slave" foil is depicted in Figure 3. The same data has been used in Figure 4 to outline the results. The calculated average for each interval is shown for the entire interval.

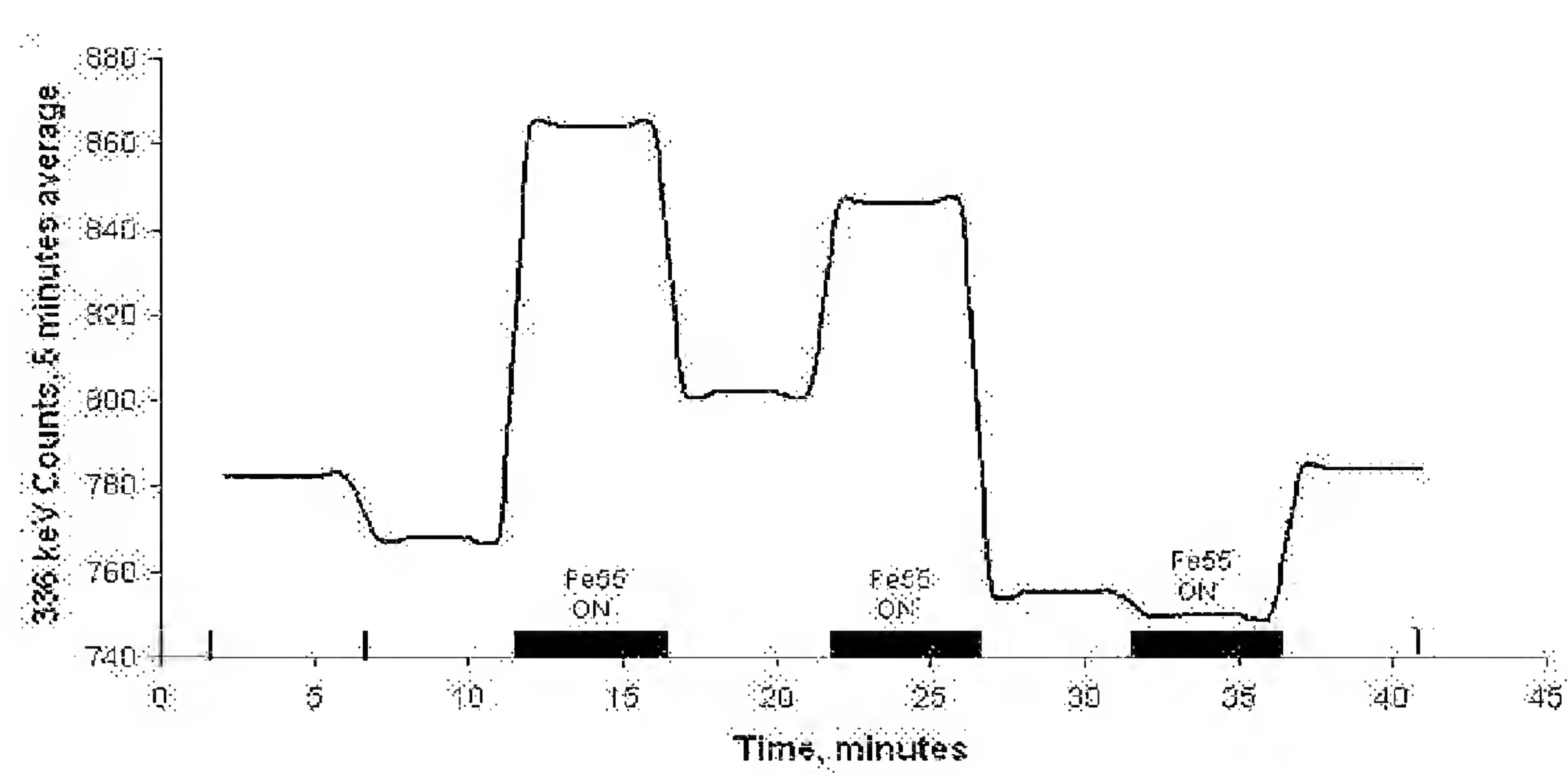

Figure 4. Graph of remote triggering of CLINAC photo-excited indium foils at 12 meters. Averages shown during the various time intervals. Germanium counter.

The experiment was repeated again at 12 meters between the master foil and the slave foil using a NaI counter. The results are depicted in Figure 5 using the average recorded in each interval and showing for the whole interval.

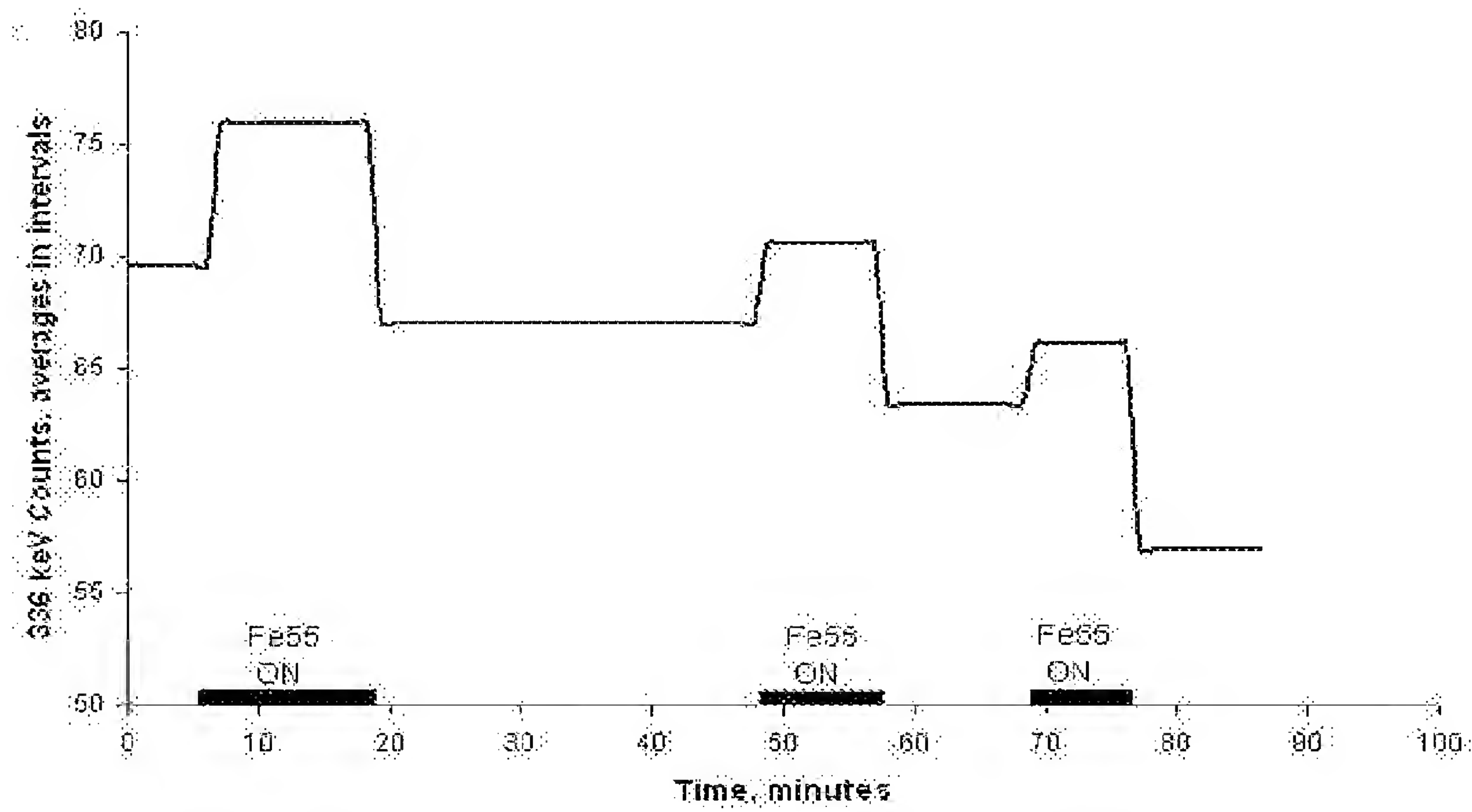

Figure 5. Graph of remote triggering of CLINAC photo-excited indium foils at 12 meters. Averages shown during the various time intervals. NaI counter.

Another experiment was conducted with a distance of 1600 meters separating the master foil and the slave foil with the same results.

It clearly demonstrates that remote triggering of the "master" foil resulted in a 4-sigma above the ^{115m}In spontaneous decay baseline of 336 keV characteristic gamma photon emission from the "slave" foil as measured by the gamma counting system. The two foils were separated by at least 12 meters, then 1600 meters, and 15 cm of lead. It is apparent that it is possible to stimulate "master" foil multiple times, however, it appears that only a limited number of QE states are available for remote triggering.

4. Conclusion

This experiment strongly demonstrates that useful quantum information can be transferred through quantum channels via modulation of quantum noise (accelerated radioactive decay of ^{115m}In). Thus, this modality of QE transmission is fundamentally different from optical QE information transfer via quantum entangled space "q-bits" as developed by information theorists for quantum channel information transfer. Additionally, there is no obvious potential for signal degradation with increasing distance nor the problem of misalignment of optical information transfer systems.

Although ^{115m}In metastable states have a spontaneous decay half-life of 4.68 hours, other much longer-lived metastable states such as ^{178m2}Hf with a half-life of 31 years could potentially be utilized for viable global communications.

Even though only two foils were quantum entangled per irradiation during this experiment, there is no foreseeable reason why multiple numbers of foils could not be utilized as well. If this is possible, one "master" foil could be utilized to remotely trigger multiple QE "slave" foils.

Acknowledgement

I thank Professor Robert Desbrandes (LSU emeritus from Petroleum Engineering) for his help in the experiments and their interpretation. I also thank the Veterinary School of LSU for the use of its CLINAC accelerator and the Nuclear Science Center of LSU for using its HICS Cobalt 60 source and Germanium gamma counter

References

1. A. Einstein, B. Podolsky, N. Rosen; Phys. Rev. 47, 777, (1935)

2. Wootters, W.K., Zurek, W.H., "A Single Quantum Cannot be Cloned" *Nature* **299**, 802-803, (1982)

3. Shields, et al., Phys. Stat. Sol. (b) **238**, 353-359, (2003)/**DOI** 10.1002/pssb.200303093

4. G.W. Ford, and R.F. O'Connell. Physics Letters A, **286,** pp. 87-90 (2001).

5. D. L. Van Gent, arXiv:arch-ive.**nucl-ex/0411047**, 25, Nov. 2004.

6. J.J. Carroll, et al. *Hyperfine Interactions*. **135**, 3-50, Kluwer Academic Publishers (2001).

7. C.B. Collins, et al. *Hyperfine Interactions.* **135,** 51-70, Kluwer Academic Publishers (2001).

8. Silberhorn, et al. Physical Review Letters, 86, 19, pp. 4267-4270, 7 May 001.

Appendix G : 37 C.F.R. 1.132 Declaration:

Declaration concerning responses to actions and the statistical analysis provided with the setup measurements dated December 5th, 2003, May 20th, 2004 and May 27th, 2004

The following appendix is a declaration section 37 C.F.R 1.132

I, Franck DESBRANDES, declare that I am warned that willful false statements and the likes are punishable by fine or imprisonment, or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.

I declare that all statements made of my own knowledge are true and that all statements made on information and belief are believed to be true.

F. Desbrandes

Franck DESBRANDES

S-Signed: /Franck DESBRANDES/

Original with my handwritten signature for the file.

I have been acting as assistant of my father who is 87 years old during this examination.

I have made the statistical analysis of the mentioned setups using the Excell data files communicated by my father.

Because the number of measurement sessions is limited, I decided to consider the departures from the trend for stimulated and un-stimulated periods. The resulting statistical analysis is therefore limited, and confidence intervals may be optimistic when the number of un-stimulated intervals is low.

However, two setup sessions have been done in very similar conditions (the In-In Fe-55 stimulation first setup on December 5th 2003, and the In-In Fe-55 stimulation second setup on May 20th, 2004 which is almost a replication), each one providing departures from the tend. I have not extended the statistical analysis over the combined sessions.

F.D

I declare that I believe that I am qualified to analyze statistically the measurement data mentioned:

- I am an engineer in electronics and radio electricity from ENSERB, Bordeaux, France:
- I hold a MEE from Rice University, Texas;
- I hold a Master of Financial Techniques from ESSEC, France.

I declare that I have financial interests in the issuance of the patent directly and indirectly:

- I am the benevolent manager of E-QUANTIC COMMUNICATIONS, which is the unregistered assignee of the patent filing;
- I have charged consulting fees, and may charge additional consulting fees to E-QUANTIC COMMUNICATIONS for draft documents provided to my father in relation to this examination, and more particularly for this response;
- I am an associate of E-QUANTIC COMMUNICATIONS with a 32.8% of the capital.

F.D.